

②

NAVAL POSTGRADUATE SCHOOL

Monterey, California

AD-A246 443



DTIC
ELECTE
FEB 26 1992
S B D

THESIS

REFINING THE EVALUATION
OF
INTERNATIONAL CODEVELOPMENT PROGRAMS

by

James I. Stoops

December, 1991

Thesis Advisor:

Stephen Zirschky

Approved for public release; distribution is unlimited

92-04679



92 2 24 010

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE

REPORT DOCUMENTATION PAGE				
1a REPORT SECURITY CLASSIFICATION UNCLASSIFIED			1b RESTRICTIVE MARKINGS	
2a SECURITY CLASSIFICATION AUTHORITY			3 DISTRIBUTION/AVAILABILITY OF REPORT APPROVED FOR PUBLIC RELEASE; DISTRIBUTION IS UNLIMITED.	
2b DECLASSIFICATION/DOWNGRADING SCHEDULE				
4 PERFORMING ORGANIZATION REPORT NUMBER(S)			5 MONITORING ORGANIZATION REPORT NUMBER(S)	
6a NAME OF PERFORMING ORGANIZATION Naval Postgraduate School		6b OFFICE SYMBOL (If applicable) 55		7a NAME OF MONITORING ORGANIZATION Naval Postgraduate School
6c ADDRESS (City, State, and ZIP Code) Monterey, CA 93943-5000			7b ADDRESS (City, State, and ZIP Code) Monterey, CA 93943-5000	
8a NAME OF FUNDING/SPONSORING ORGANIZATION		8b OFFICE SYMBOL (If applicable)		9 PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER
8c ADDRESS (City, State, and ZIP Code)			10 SOURCE OF FUNDING NUMBERS	
			Program Element No.	Project No.
			Task No.	Work Unit Accession Number
11 TITLE (Include Security Classification) REFINING THE EVALUATION OF INTERNATIONAL CODEVELOPMENT PROGRAMS				
12 PERSONAL AUTHOR(S) STOOPS, JAMES IRVIN				
13a TYPE OF REPORT MASTER'S THESIS		13b TIME COVERED From To		14 DATE OF REPORT (year, month, day) 1991 DECEMBER 19
15 PAGE COUNT 116				
16 SUPPLEMENTARY NOTATION The views expressed in this thesis are those of the author and do not reflect the official policy or position of the Department of Defense or the U.S. Government.				
17 COSATI CODES			18. SUBJECT TERMS (continue on reverse if necessary and identify by block number)	
FIELD	GROUP	SUBGROUP	INTERNATIONAL CODEVELOPMENT, EVALUATIONS	
19 ABSTRACT (continue on reverse if necessary and identify by block number) THIS RESEARCH EXAMINES THE EVALUATION PERFORMED BY THE NAVY INTERNATIONAL PROGRAMS OFFICE ON UNITED STATES NAVY PROGRAMS PROPOSED AS CANDIDATES FOR INTERNATIONAL CODEVELOPMENT AGREEMENTS. PRIMARY RESEARCH CONSISTS OF A SPREADSHEET ANALYSIS OF 22 PROGRAM EVALUATIONS CONDUCTED BY THE NAVY INTERNATIONAL PROGRAMS OFFICE DURING 1990-1991.				
20 DISTRIBUTION/AVAILABILITY OF ABSTRACT <input checked="" type="checkbox"/> UNCLASSIFIED/UNLIMITED <input checked="" type="checkbox"/> SAME AS REPORT <input checked="" type="checkbox"/> LIMIT USERS			21 ABSTRACT SECURITY CLASSIFICATION Unclassified	
22a NAME OF RESPONSIBLE INDIVIDUAL Stephen Zirschky			22b TELEPHONE (Include Area code) 408-646 2048	22c OFFICE SYMBOL

DD FORM 1473, 84 MAR

83 APR edition may be used until exhausted
All other editions are obsoleteSECURITY CLASSIFICATION OF THIS PAGE
UNCLASSIFIED

Approved for public release; distribution is unlimited.

Refining the Evaluation of
International Codevelopment Programs

by

James I. Stoops
Lieutenant, Supply Corps, United States Navy
B. A., Rutgers University--Camden, 1971

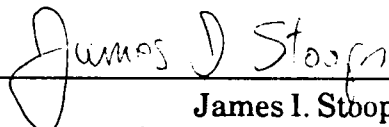
Submitted in partial fulfillment
of the requirements for the degree of

MASTER OF SCIENCE IN MANAGEMENT

from the

NAVAL POSTGRADUATE SCHOOL
December, 1991

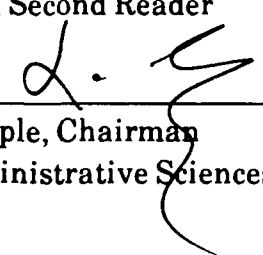
Author:


James I. Stoops

Approved by:


Stephen Zinschky, Thesis Advisor


Patrick Parker, Second Reader


David R. Whipple, Chairman
Department of Administrative Sciences

ABSTRACT

This research examines the evaluation performed by the Navy International Programs Office on United States Navy programs proposed as candidates for international codevelopment agreements. Primary research consists of a spreadsheet analysis of 22 program evaluations conducted by the International Programs Office during 1990-1991. Secondary research recounts the history of the U. S. Government's international armaments cooperative efforts from World War II to the present, explores current issues, and examines Department of Defense and Department of the Navy policy and procedures governing international cooperative programs.

Accession For	
NTIS CPA&I	<input checked="" type="checkbox"/>
DTIC TAB	<input type="checkbox"/>
Unannounced	<input type="checkbox"/>
By Distribution	
By _____	
Distribution/	
Availability Codes	
Dist	Avail and/or Special
A-1	



TABLE OF CONTENTS

I.	INTRODUCTION	1
A.	BACKGROUND	1
B.	OBJECTIVES	2
C.	RESEARCH QUESTION	3
D.	SCOPE, LIMITATIONS AND ASSUMPTIONS	3
	1. Scope	3
	2. Limitations	4
	3. Assumptions	4
E.	LITERATURE REVIEW AND METHODOLOGY	4
F.	OVERVIEW	5
II.	BACKGROUND	6
A.	U. S. PARTICIPATION IN MODERN MILITARY ALLIANCES	6
B.	U. S. ARMS COOPERATION EFFORTS SINCE WORLD WAR II	10
C.	ADVANTAGES AND DISADVANTAGES OF ARMS COOPERATION	12
D.	FORCES CONTRIBUTING TO ARMS DIVERSITY	15
E.	THE EVOLUTION OF RSI	17
F.	IMPACT OF RSI	23
G.	OBSTACLES ON THE TWO-WAY STREET	24

H.	DOD SUPPORT OF ARMAMENTS COOPERATIONS	27
I.	DON SUPPORT OF ARMAMENTS COOPERATION	30
J.	THE NAVY INTERNATIONAL PROGRAMS OFFICE (IPO)	33
III.	PRESENTATION OF DATA	37
A.	BACKGROUND TO THE DEVELOPMENT OF SUCCESS CRITERIA	37
	1. Original Evaluation Procedure	37
	2. OSD Decision Matrix	40
B.	INITIAL SUCCESS CRITERIA EVALUATION	43
	1. U. S./Foreign Evaluation Criteria	43
	2. Five-step Evaluation Method	45
	3. Initial Application Of Evaluation Criteria and Method	46
	a. Programs Evaluated	46
	b. Evaluation Sheets	47
	c. Results of Initial Application	54
	4. Second Application of Evaluation Criteria and Method	54
	a. Programs Evaluated	54
	b. Evaluation Sheets	55
	c. Results of Second Application	68
C.	REVISED SUCCESS CRITERIA EVALUATION	69
	1. Revised U. S./Foreign Evaluation Criteria	69
	2. Revised Evaluation Method	71

3. Application of Revised Evaluation Criteria and Method	71
a. Programs Evaluated	71
b. Evaluation Sheets	72
c. Re-evaluation of Programs Using Revised Evaluation Criteria and Method	77
d. Results of Application of Revised Criteria and Method	84
D. ANOMALIES RESULTING FROM APPLICATION OF REVISED CRITERIA AND METHOD	84
IV: ANALYSIS OF DATA	86
A. SPREADSHEET ANALYSIS OF INITIAL EVALUATION CRITERIA AND METHOD	86
1. Construction of Spreadsheet	86
2. Results of Spreadsheet Analysis	89
B. SPREADSHEET ANALYSIS OF REVISED EVALUATION CRITERIA AND METHOD	90
1. Construction of Spreadsheet	90
2. Results of Spreadsheet Analysis	92
C. REASON FOR DISCREPANCY BETWEEN EVALUATION SHEETS AND SPREADSHEET ANALYSIS	94
D. APPLYING THE SPREADSHEET CALCULATIONS TO THOSE CANDIDATE PROGRAMS NEVER EVALUATED WITH REVISED CRITERIA AND METHOD	95

E.	FINAL PRIORITY RANKING OF ALL 22 CANDIDATE PROGRAMS	96
F.	STATISTICAL ANALYSIS OF SPREADSHEET EVALUATION SCORES	98
G.	CORRELATION OF IPO'S EVALUATION CRITERIA WITH OSD SUCCESS INDICATORS	101
V.	CONCLUSIONS AND RECOMMENDATIONS	103
A.	CONCLUSIONS	103
B.	RECOMMENDATIONS	103
	LIST OF REFERENCES	105
	INITIAL DISTRIBUTION LIST	107

I. INTRODUCTION

A. BACKGROUND

On October 5, 1990, the Navy International Programs Office (IPO) instituted a five-step evaluation method using a table of 14 success criteria, grouped in three sections, to evaluate Research and Development (R&D) programs proposed as candidates for international codevelopment agreements between the U. S. Government and allied nations. Before the development of the success criteria, candidate programs were qualitatively evaluated using a lengthy worksheet. With the introduction of the success criteria, candidate programs were evaluated to identify those programs with a low likelihood of success in the international arena, and so direct the IPO's resources at those candidate programs more likely to succeed.

The evaluation consisted of applying the 14 success criteria twice to each candidate program, once to rate U. S. participation in the program and once to rate allied participation. Six strength ratings were then calculated, one for each section of criteria for both the U. S. Government's and the foreign participation. These paired ratings were compared to each other; based on their "degree of convergence," a weighted factor ranging from 0.5 to 1.5 was then applied to each paired ratings. The three resultant

weighted rates were added to arrive at a final composite strength rating for each candidate program. Eighteen candidate programs were thus evaluated in the following months; they were ranked in descending order according to their composite strength ratings.

On July 30, 1991, IPO revised the success criteria, dropping two items, substituting in for two others, and regrouping the criteria into four sections vice three. Generally, the five-step evaluation process remained unchanged. The new procedure did call, however, for only a single "strength matching" weight to be applied to the entire evaluation to determine the candidate's composite strength, this instead of the area "degree of convergence" weights. Four additional candidate programs and six of the original 18 candidate programs were evaluated using the revised criteria and procedures. The results revealed some anomalies: not only did the four additional candidate programs score generally lower than the six original programs, but the priority ranking of some original programs was reversed.

B. OBJECTIVES

The general objective of this research was to examine the impact that the revised evaluation criteria and procedures had on the priority ranking of candidate programs, and so verify the accuracy of the revised criteria and procedures at

indicating a program's potential for success as an international codevelopment agreement.

C. RESEARCH QUESTION

The primary research question addressed by this research is as follows:

- How can the evaluation conducted by the Navy International Programs Office on programs being considered for nomination as international codevelopment agreements be refined so as to offer a more accurate "front end" analysis of the candidate programs?

Secondary research questions addressed by this research in support of the primary research question are as follows:

- What has been the U. S. Government's participation in international armaments agreements since World War II?
- What are the current issues affecting efforts at international armaments agreements?
- What are Department of Defense and Department of the Navy policies and procedures regarding international codevelopment agreements?

D. SCOPE, LIMITATIONS AND ASSUMPTIONS

1. Scope

This research examines the evaluations performed by IPO on 22 candidate programs from October, 1990 through July, 1991. Data for this research consist of the original and revised success criteria, the 18 evaluations conducted using the original criteria and procedures, and the ten evaluations conducted using the revised criteria and procedures.

2. Limitations

The only significant limitation affecting this research was an inability to access the computer program that generated the evaluation sheets for the International Programs Office; access to the computer was denied for security reasons. In lieu of access, computer printouts representing all the evaluations performed by the IPO during the period of the research were provided.

3. Assumptions

The research assumes that the reader has a basic understanding of spreadsheet calculations and construction.

E. LITERATURE REVIEW AND METHODOLOGY

A literature review was conducted to determine the history of the U. S. Government's participation in international armaments agreements since World War II, and to determine current issues affecting international codevelopment efforts. A review of relevant Department of Defense instructions and Department of the Navy reports was conducted to determine official policy and procedures.

The methodology for this research consisted primarily of a personal interview with Mr. Frank D. Kenlon, Director for International Programs with the Navy International Programs Office in September, 1991. Extensive use is made of a spreadsheet analysis of the individual evaluation sheets.

F. OVERVIEW

Chapter II, Background, recounts the U. S. Government's involvement in international armaments cooperative agreements with its allies from World War II to present. It additionally explores current issues in codevelopment and coproduction agreements, and examines current and proposed Department of Defense (DoD) and Department of the Navy (DoN) policy regarding international agreements.

Chapter III, Presentation of Data, displays the data used in conducting this research. Tables exhibiting the original and revised success criteria, and individual evaluation sheets for all program evaluations conducted by the IPO are included.

Chapter IV, Analysis of Data, reproduces the cell-by-cell spreadsheet analysis of the various evaluation sheets, and correlates the IPO's success criteria to stated Office of the Secretary of Defense (OSD) international program success indicators.

Chapter V offers the conclusions and recommendations developed as a result of the research.

II. BACKGROUND

A. U. S. PARTICIPATION IN MODERN MILITARY ALLIANCES

The United States' involvement in its present day military alliances is largely a result of the economic and military uncertainties that characterized the world in the years following World War II. The war levied a terrible toll across the Europe and Asia, so that

. . . the global balance of power after the war would be totally different from that preceding it. Former Great Powers--France, Italy--were already eclipsed. The German bid for mastery in Europe was collapsing, as was Japan's bid in the Far East and Pacific. Britain . . . was fading Only the United States and the USSR counted, so it seemed; and of the two, the American "superpower" was vastly superior (Kennedy, 357).

Much of the United States' power and prestige lay in its economic might:

The country's GNP measured in constant 1939 dollars rose from \$88.6 billion (1939) to \$135 billion (1945) industrial expansion in the United States rose at a faster pace . . . than at any period before or since Among the Great Powers, the United States was the only country which became richer--in fact, much richer--than poorer because of the war (Kennedy, 357-358).

By comparison, the former Great Powers (Germany, Japan, Italy, France and Great Britain) all suffered greivous economic reversals as a result of the war. Germany was divided up into four military occupation zones, and later, into two countries; its industrial base, devastated by bombing, was dismantled; its national income and output dropped over two-thirds between

1938 and 1946 (Kennedy, 365). Japan was similarly occupied; its national income fell 43 percent from 1936 to 1946 (Kennedy, 365). Italy's GNP in 1945 was only 60 percent of its 1938 level (Kennedy, 365-366). France had been plundered by the Germans for four years and then suffered from the heavy fighting during 1944; its 1945 income was only 50 percent of its prewar level (Kennedy, 366). Great Britain fared better than those countries, but, even so, was suffering economically at the end of the war; it had depleted its gold and dollar reserves, worn out its domestic industrial capability, and was heavily dependent on the United States for much of its arms, shipping, food and other supplies (Kennedy, 367).

The United States' economic might was projected worldwide by its military power. At the end of the war, the U. S. military was comprised of some 12.5 million personnel (7.5 million deployed overseas); its modern weaponry included 1200 warships, 3000 bombers, and a monopoly of atomic weapons (Kennedy, 358). Of the European powers, only Great Britain possessed a credible military force at the end of the war, with forces deployed to

. . . North Africa, Italy, Germany, (and) Southeast Asia. Despite heavy losses, the Royal Navy possessed over 1,000 warships, nearly 3,000 minor war vessels, and nearly 5,500 landing craft. RAF Bomber Command was the second-largest strategic air force (by far) in the world (Kennedy, 367).

If World War II heralded the emergence of the United States as a superpower, the same must also be said of the

Soviet Union. The increasing Soviet influence can be seen by its territorial growth during and after the war. Its European boundaries expanded

. . . in the north at the expense of Finland, in the center at the expense of Poland; and in the south, recovering Bessarabia, at the expense of Rumania. The Baltic states of Estonia, Latvia, and Lithuania were reincorporated into Russia. Part of East Prussia was taken, and a slice of eastern Czechoslovakia . . . was also thoughtfully added, so that there was direct access to Hungary. To the west and southwest of this enhanced Russia lay a new cordon sanitaire of satellite states, Poland, East Germany, Czechoslovakia, Hungary, Rumania, Bulgaria, Yugoslavia and Albania (Kennedy, 361).

In the Far East, the Soviets occupied Manchuria, North Korea and Sakhalin and linked up with the Chinese Communists (Kennedy, 367). After the war, Stalin would reduce the size of the Soviet Army by two-thirds

. . . to the still very substantial total of 175 divisions, supported by 25,000 front-line tanks and 19,000 aircraft. It would still remain . . . the largest defense establishment in the world--a fact justified . . . by its need to deter future aggressors and . . . to keep control of its newly acquired satellites in Europe as well as its conquests in the Far East (Kennedy, 363).

The Soviet military strength belied the country's economy, which was shattered by the war. Estimates put the number of Soviet deaths as a result of the war at 20-25 million; in addition, livestock, farm equipment, the transportation infrastructure, and housing were likewise decimated by the occupying German Army (Kennedy, 362). In short, "the Russia of 1945 was a military giant and, at the same time, economically poor, deprived and unbalanced" (Kennedy, 362).

The ideological splitting of Europe into the Capitalist Western bloc and the Communist Eastern bloc became apparent soon after the end of the War. It was noted in 1946 and early in 1947 that

. . . various plebiscites and regional elections in the German zones (of occupation) were showing "the political complexion of West Germany . . . beginning to differ markedly from that of East Germany"; the steady elimination of any non-Communist elements in Poland, Bulgaria, and Rumania was mirrored by the internal political crisis in France in April, 1947, when the Communists were forced to resign from the government. A month after, the same happened in Italy. In Yugoslavia, Tito's political domination (in place of the Allied wartime agreements about shared power) was interpreted by the West as a further step in Moscow's planned advance (Kennedy, 375).

A two-pronged strategy was developed by the West to contain what was perceived as the Soviet threat to Western and Southern Europe. The first element of this strategy

. . . was to indicate to Moscow those regions of the globe which the United States "cannot permit . . . to fall into hands hostile to us." Such states would . . . be given military support to build up their powers of resistance; and a Soviet attack on them would be regarded virtually as a casus belli The (second and) most crucial component of any long-term containment policy would be a massive program of U. S. economic aid, to permit the rebuilding of the shattered industries, farms and cities of Europe and Japan; for that would not only make the latter far less likely to be tempted by Communist doctrines of class struggle and revolution, it would also help to readjust the power balances in America's favor (Kennedy, 376).

In Europe, the economic aid element of the containment strategy was implemented by the Marshall Plan in 1947; the military support element would come two years later when,

following the Berlin crisis of 1948-49, the North Atlantic Treaty Organization (NATO) was created.

B. U. S. ARMS COOPERATION EFFORTS SINCE WORLD WAR II

In the first decade following the signing of the NATO treaty, the member nations, confronted by the Sputnik launch with an eclipsing of Western missile technology, began to cooperate on armaments (Taft, 15). An early expression of this cooperative trend was

. . . the NATO Co-production Program agreed by the Alliance in 1957 Since then there have been literally hundreds of bilateral and multilateral European and transatlantic cooperative programs--co-development, co-production, licensed production projects, MOU's, dual production, industry-to-industry efforts, outright weapons sales, one allied nation to another (Taft, 15).

Three phases of the Government's arms cooperation efforts since World War II can be identified. The first, lasting from the end of the war until the mid-sixties,

. . . was characterized by grant aid known as the Military Assistance Program (MAP) the emphasis was on the no-cost (to the recipient) transfer of equipment directly from U. S. Force's inventories--initially surplus stocks developed as a result of modernization of our own forces--or from additional new production of systems being produced for U. S. Forces (Cole, F-3).

Funding for the MAP came entirely from the U. S. Congress; the funds were administered by a central office, the Director of Military Assistance, that did not concern itself with the implementation of the programs by the various acquisition and logistics Commands involved (Cole, F-3).

These arrangements worked well. Service hardware Program Managers had few if any complaints. The equipment being furnished was standard U. S. The requirements were easily folded into contracts for equipping U. S. forces; the funding was U. S. budget authority; and there were no issues of R&D recoupment, administrative surcharges, asset use charges, agent fees, co-production, offsets, MOUs, etc., that became commonplace for providing U. S. arms to friends and allies (Cole, F-3).

The second phase of arms cooperation overlaps the first but can be characterized by

. . . a gradual shift from MAP to sales on a government-to-government basis usually referred to as Foreign Military Sales (FMS), and to direct commercial sales (Cole, F-3).

The Foreign Military Sales program

. . . initially focused on the stronger economies of European NATO . . . with the objective of having allies obviously able to pay their own way assume larger shares of the common defense burden.

MAP procedures continued for most other countries friendly or allied to the United States and also for some European NATO allies (Cole, 13-14).

Responsibility for FMS was transferred from the Director of Military Assistance to the newly established position of Director of International Logistics, and later, along with responsibility for MAP, to the Director of the Defense Security Assistance Agency (DSAA) upon that agency's establishment in 1971 (Cole, F-3 - F-4). Congress began to curtail MAP funds, with the result that DSAA attention became increasingly focused on FMS transactions; FMS credits became the means by which countries progressed from MAP to cash sales (Cole, F-4). DSAA (conceived as simply the fund manager and resident authority for international arms programs),

eventually became "firmly astride and enmeshed in the acquisition and logistics function" (Cole, F-4). In response, the

. . . OSD acquisition and logistics staffs, the Military Departments and Logistics Commands demanded and received a greater voice in international arms matters. By 1976 program direction had become diffused and controversies were common (Cole, F-4).

A DoD task force, charged by Secretary of Defense Rumsfeld with reviewing Security Assistance, recommended on January 14, 1977 that DSAA should report directly to the Defense Acquisition Executive vice the Assistant Secretary of Defense-International Security Affairs, but this recommendation was never acted upon by the incoming Carter Administration (Cole, F-4).

The third (and current) phase of the Government's arms cooperation efforts is characterized by declining U. S. arms exports and an increase in the number of codevelopment agreements (Cole, F-4). An examination of this phase occurs in later in this chapter as part of the discussion of Rationalization, Standardization and Interoperability (RSI) as it applies to NATO.

C. ADVANTAGES AND DISADVANTAGES OF ARMS COOPERATION

The most obvious advantage to two or more countries entering an arms cooperation agreement is economic. Thomas A.

Callaghan notes:

For centuries commercial economics and trade have been moving towards ever-larger markets, providing economies of scale and ever more affordable prices Defense economics has bucked this trend. Here we have ever-larger product lines, ever-smaller production runs, small national markets, and (consequently) ever-higher prices (Callaghan, 61).

It follows, then, that an increase in the market for a weapon system through arms cooperation agreements would lead to fewer product lines, larger production runs, and lower prices. This simple fact was

. . . first appreciated within Europe, and more so than in the United States. There were good reasons for this, not least of which were the budgetary constraints with which the European states were faced, the range of conventional operational requirements they had to meet with considerable fewer resources, and the comparatively small production run each could afford on any one program (Edmonds, 11).

But this logic holds true for any arms cooperation agreement in that all the participating countries would experience cost reductions through

. . . improvements in production arising from the learning process, through quantity purchase of materials and parts, better use of fixed capital and steady cash flows (Edmonds, 11).

Two political arguments can be made as well in favor of arms cooperation agreements. First, a weapon system that can be demonstrably shown to have reduced unit costs would be more likely to be accepted by the citizens of a country, especially when the risks associated with developing and producing the

weapon system could be shared with other nations (Edmonds, 11-12). Secondly, a country that participates in arms cooperation agreements with its allies

. . . demonstrates a willingness to adjust purely national priorities in the interest of alliance cohesion and, arguably, a willingness to further the wider political objectives of creating interdependencies among . . . allies and . . . establishing an integrated defense industry (Edmonds, 12).

A final advantage to arms cooperation agreements is that it is militarily more desirable for alliance forces operating in conjunction with each other to be equipped with standardized weapons, logistics and communications systems (Edmonds, 14).

Set against these reasons to enter arms cooperation agreements are the pressures inherent in a sovereign state to maintain a unique domestic arms production capability; it would be disadvantageous for a nation to enter such an agreement when it is that government's desire

. . . to limit reliance upon external sources of military equipment, to reduce the burden of imports on their balance of trade, and to ensure maximum employment for workers in defense and defense-related industries (Edmonds, 1).

As Shaffer notes,

. . . cooperation in armaments is not an area of national policy isolated from security policy or from more general domestic and foreign policy concerns. As a result of this linkage, nations desire armament self-sufficiency, to the extent economically and politically feasible, in order to avoid dependence on others . . . in formulating and implementing policy objectives (Shaffer, 27).

In addition, compelling reasons of national security could often deter one country from entering an arms cooperation agreement due to the possibility of sensitive technology transfer.

D. FORCES CONTRIBUTING TO ARMS DIVERSITY

The earliest attempts at arms cooperation in NATO led to a certain homogeneity of weapons among the alliance members in that "virtually all military equipment was supplied by the United States" (Shaffer, 29). This uniformity, driven by necessity as much as the booming postwar American economy, soon fragmented.

Five specific factors have been identified as contributing to the push toward NATO weapons diversity. The first of these factors is NATO's "overreliance on nuclear weapons to the detriment of conventional forces" (Cannizzo, 57), especially in the early years of the NATO alliance:

Presuming themselves safe from conventional attack by the USSR and its allies, (NATO) general purpose forces were by and large starved of resources and left to deteriorate; the member states were left free to a large degree to go their separate, sovereign ways in pursuit of national security The United States strongly advocated this reliance on massive retaliation and did not particularly mind the burgeoning proliferation of different types of conventional weapons systems (Cannizzo, 57).

The United States' support of a strategic defense of NATO should be viewed in light of its then vastly superior nuclear

arsenal and its later commitment of conventional forces to the conflicts in Korea and Vietnam.

The second factor that advanced weapons diversity in NATO is closely related to the first:

The United States encouraged the postwar rebuilding of European defense industries in order not to overtax the "arsenal of democracy" and to help spur reconstruction efforts (Cannizzo, 57).

A third factor derives from the economic problems afflicting the United States beginning in the early sixties brought on by an unfavorable balance of trade and the flow of gold passing through U. S. borders (Cannizzo, 57):

The United States patently became more interested in forcing the Europeans to buy U. S. equipment and in finding ways to offset the cost of stationing U. S. troops abroad than it was in fostering weapons cooperation. Such policies constituted a source of irritation for the European Allies, which was compounded by the "buy American" acts Not only the United States has continuing economic difficulties, but the Europeans have as well, which today have helped create a situation more compatible with protectionism than international cooperation (Cannizzo, 57).

Cannizzo identifies the United States' involvement in Vietnam as the fourth factor lending to NATO weapons diversity:

The diversion of U. S. interests and attention to Southeast Asia clearly reduced U. S. participation in NATO affairs and procurement policies . . . the United States drew on its stocks of equipment in Europe and . . . this left large gaps which remain unfilled even today (Cannizzo, 57).

Finally, Cannizzo points to the NATO experience with arms cooperation projects themselves as leading to diversity. Citing the consortium created to manage the coproduction of

the F-16 as an example, Cannizzo points to a myriad of problems:

. . . charges of bribery and even hints of murder during the bargaining and selection phases; continual cost increases; acrimonious debate over unfulfilled promises of jobs, income, and other benefits; disagreements over third-country sales; and even disgruntlement over the plane's performance (Cannizzo, 57).

Another example of an unsuccessful NATO joint program was the attempt by the United States and West Germany to develop the MBT-70 battle tank which "ended in failure after more than \$400 million had been invested" (Kitfield, "Finally," 77).

The current NATO policy of "Rationalization, Standardization, and Interoperability" (RSI) is the latest expression of the alliance's efforts to promote arms cooperation with the hope of realizing

. . . not only the militarily desirable goal of standardizing equipment and harmonizing logistical procedures, but also the politically desirable goal of alliance solidarity (Feldman, 48).

E. THE EVOLUTION OF RSI

RSI is intrinsically tied to the theory of "structural disarmament" as formulated by Callaghan. Callaghan states that the Western nations are

. . . experiencing (a) disarmament phenomenon of more and more money producing fewer and fewer weapons, less "readiness," and even less combat sustainability. The cause is structural. No nation--not even the US--provides a large enough defense market to develop and produce everything itself (Callaghan, 61).

This section will examine the concept of RSI, and will trace its implementation through laws enacted by the United States Congress and policy directed by the President and the Department of Defense.

A definition of terms is in order:

"Rationalization" is defined as any action which increases the effectiveness of NATO by improving the command-support structure and consolidating the various national logistical systems. It includes standardization, specialization, interoperability, cross-servicing, and general cooperation of military and non-military matters.

"Standardization" refers to the achievement of the closest practical cooperation among forces, sharing of systems designs, agreement on operational, administrative, and logistic procedures, and common tactical doctrine and organization.

"Interoperability" consists of making different weapons systems work together by using common or compatible components, fuel, and ammunition (Feldman, 50).

As was previously mentioned, a high level of standardization was achieved in the early years of NATO by the simple fact that most weapons were provided by the United States. Continued economic aid to the European allies by the United States led to a rebuilding of European industry so that, by the late 1950s, "European industry was sufficiently recovered to permit the independent development of exclusively European weapons systems" (Feldman, 51).

The Warsaw Pact modernization of the 1970s and the realization that NATO was wasting up to \$15 billion a year because of weapons diversity led to a renewed call for standardization in conjunction with the rearming of NATO

(Feldman, 51). But purely national concerns often overrode alliance concerns so that

. . . NATO leaders found it increasingly difficult to convince parliaments to spend large amounts of foreign exchange on the purchase of weapons from abroad, because of their fear of generating domestic unemployment. Therefore, most NATO members began in the 1970s to demand economic compensation in the form of "offsets" such as coproduction or countertrade as a condition of purchase (Feldman, 51).

In the United States, the Government began to take the initiative in promoting RSI. An amendment to the Defense Appropriation Authorization Act of 1975 called for the Secretary of Defense to ascertain the cost of the failure to standardize weapons in NATO and to develop a plan for arms cooperation (Feldman, 51). The 1976 Nunn amendment encouraged reciprocal procurement of equipment between the U. S. and other NATO nations; authorized the SECDEF to waive the "Buy American" law in the interest of NATO standardization and interoperability; and enabled the establishment of bilateral reciprocal procurement MOUs between the U. S. and the European nations of NATO (Naval, 25).

President Ford introduced the two-way street concept to the Europeans at the 1976 NATO summit, and advised them that, to compete effectively with U. S. defense industry, the Europeans would have to sacrifice some national concerns and combine their resources (Feldman, 52).

The Carter administration approached arms cooperation from two almost diametrically opposing views. On the one hand, the administration

. . . wanted to greatly decrease the U. S. sales of weapons around the world, thus avoiding a reputation as "Merchants of Death." Correspondence, dubbed the "Leprosy Letter," was sent to all U. S. embassies early in the Carter administration prohibiting support and assistance to U. S. defense industry corporations trying to sell overseas. Legislation was enacted by Congress disallowing foreign marketing expenses to be charged as a valid cost of doing business (Naval, 23).

On the other hand, the Carter administration encouraged arms cooperative agreements with allies; in particular, Under Secretary of Defense for Research and Engineering William Perry greatly furthered the cause of RSI. Through Perry's DoD Directive 2010.6, a three-pronged approach to RSI was implemented:

First, the general and reciprocal procurement Memoranda of Understanding (MOUs) . . . were to be used to create a "two-way street" in defense trade. Each country would agree to remove domestic obstacles to the mutual penetration of defense markets. Each country would obtain exemptions from the other's customs, duties, tariffs, and protectionist legislation. In addition, each country would ideally give equal consideration to all qualified bidders regardless of the firm's nationality

The second prong . . . was called "Dual Production," and attempted to avoid redundant research and development (R&D) expenditures by encouraging nations to produce a system already developed by another member

The third . . . strategy for achieving RSI was called the "Family of Weapons" approach it began collaboration at the R&D stage, requiring complete sharing of technology and know-how. It called for the complementary development of weapon systems in a particular mission area to be allocated to different countries, sequentially produced, and then made available to other members for production or co-production (Feldman, 52).

The first of these strategies, the negotiation of MOUs to aid in arms cooperation, received widespread support throughout NATO. Currently, formal agreements exist between the United States and 19 allied countries regarding arms cooperation. "Dual Production" continues to be favored by the DoD and the U. S. defense industry because "it approached standardization by relying on competitive R&D followed by licensed production or co-production" (Feldman, 52). The "Family of Weapons" approach was unpopular in America, on the industrial side because it called for relinquishing proprietary data (Feldman, 52), and on the military side because of high level concern "over the flow of critical technology to the Eastern bloc" (Kitfield, "Finally," 77).

The Reagan administration approached arms cooperation with an entirely different attitude. Armaments cooperation

. . . was pushed on all fronts. The "Leprosy Letter" was repudiated; the first international cooperative development program was started (Terminally Guided Warhead for the Multiple Launch Rocket System); defense cooperation offices were established in most major U. S. embassies to promote cooperation; and over thirty new cooperative development MOUs were signed (Naval, 24).

Two other developments in RSI implementation during this period are the Nunn amendments to the FY85 and FY86 Defense Appropriations Authorization Act. The former professes the Government's support of RSI

. . . but intends to achieve it by creating an open, competitive market in defense equipment--a trading structure that is hoped will accomplish more than the "piecemeal" government MOUs of (the) past (Feldman, 53).

The latter takes a more proactive role by requiring all new weapon development programs be examined for possible international cooperation; by providing \$100M as "seed money" for new, international codevelopment programs; and by providing \$25M to allow the U. S. to test and evaluate systems already developed by Allies prior to beginning domestic production of similar systems (Naval, 26). Congressional funding in support of cooperative developments climbed from \$100M in FY86, to \$145M in FY87, to \$150M in FY88, to \$153M in FY89, before falling to \$115M in FY90 (Cole, 61). Also in 1987, the Quayle amendment permitted the DoD to cooperate with foreign nations from R&D through procurement (Naval, 25-26).

President Bush has generally continued the arms cooperation policies of his predecessor. The Bush Administration has

. . . directed embassy personnel to increase the level of assistance provided to U. S. defense companies, created the Center for Defense Trade within the State Department, and proposed a "defense GATT" (General Agreement on Trade and Tariffs) that would allow free and open trade in arms and defense technology within the NATO Alliance, and with other U. S. Allies. In March 1991, the Administration proposed that the Export-Import Bank guarantee up to \$1 billion in commercial loans to members of NATO, Australia, Japan and Israel to purchase defense equipment from U. S. contractors (U. S. Congress, 21).

On April 16, 1990, the President issued his policy on offset agreements. In essence, the policy prohibits the United States Government from participating in

. . . any guarantees of offsets to any allied government or participating industry. This participation goes so far as to say that no agency can encourage, enter directly

into, or commit U. S. companies to any offset arrangements as they relate to any sale of defense articles or services to other governments. Additionally no U. S. funds may be used to finance offsets The new guidance does not prohibit negotiations for offsets by any government with the commercial industries involved as long as there is no U. S. Government encouragement, participation or commitment for the offset agreements which might be finally realized (McCarroll, 6-7).

F. IMPACT OF RSI

Objectively, the impact of the various RSI initiatives can best be appreciated by examining the balance in defense trade between the United States and the European allies. Most analysts agree that in the 1970s, the ratio of defense trade between the U. S. and its NATO allies was as much as 10:1 in favor of the United States (Costello, 70; Kitfield, "Obstacles," 86). Following Perry's RSI initiatives, this ratio was reduced to a level of 4.8:1 in favor of the U. S. in FY84 (Roos, 23). The figures for FY86 show a further leveling off of the trade ratio, to 1.6:1 in favor of the United States (Kitfield, "Obstacles," 86; Roos, 23); this last ratio can be interpreted considering Nunn amendment. Other interpretations can be offered for the decline--Kitfield points out that the FY84 figures are, in part at least, because the European nations reduced their defense purchases from the United States by 45 percent from the previous year (Kitfield, "Finally," 76). However, Congressional calculations show that the transatlantic defense trade ratio, which in 1981 had reached a high of 12:1 in favor of the U. S., had only dropped to

about 5.2:1 in 1988 (U. S. Congress, 49). In any event, the overall trend proves that some effort has been expended in behalf of RSI.

Another set of figures that reinforces the declining trade ratio balances concerns military contracts:

The amount of U. S. military contracts awarded abroad nearly doubled (during the period FY80 to FY86) from \$5.4 billion to \$9 billion During the same period, foreign military sales (FMS) by U. S. companies were cut in half, from \$14.8 billion in 1980 to \$7.1 billion (in 1986) (Kitfield, "Obstacles," 86).

G. OBSTACLES ON THE TWO-WAY STREET

Although RSI is vigorously promoted on both sides of the Atlantic, very real obstacles impede optimal progress down the "two-way street."

On this side of the Atlantic, a general problem is that there is not a clear, national consensus in support of RSI:

RSI never became a "national decision," its proponents having failed to win the blessing of Congress, the military services, industry, and labor Each group, for a variety of reasons, has at one time or another obstructed or resisted RSI (Feldman, 53).

Four major obstacles can be identified:

- the "not invented here" syndrome;
- economic protectionism;
- technological isolationism;
- the NATO burdensharing controversy (Feldman, 54).

The "not invented here" syndrome is primarily a military criticism of RSI which rests on three pillars. First, the Pentagon is rightfully concerned about any arms cooperative program that could "leave the U. S. dependent on a foreign source for any component of its defense needs" (Feldman, 54). Secondly, the Pentagon reasons that "a variety of non-standardized defense systems would be more likely to thwart Soviet countermeasures than a few standardized systems" (Feldman, 54). Finally, some officials fear that the quality of our forces' weapons might be sacrificed to achieve the political goal of armaments cooperation (Feldman, 54).

The obstacle of economic protectionism is a Congressional reaction to RSI. Although the MOUs were negotiated to ease the restrictions of protectionist statutes, elected officials can still be influenced by both industry and labor in their districts. For instance, the

. . . Aerospace Industries Association (AIA) and the Electronic Industries Association (EIA) . . . have testified before Congress . . . that RSI is a form of "affirmative action" for the Europeans The implications for U. S. jobs are great, according to the AIA, which estimates that for every \$1 billion in export sales lost, 70,000 U. S. jobs disappear as well (Feldman, 55).

Constraining armaments cooperation, Congress has supported the Arms Export Control and the Export Administration Acts; has enacted the requirement that the Department of Commerce participate in the already slow MOU process; and has included

individual protectionist measures in most of the recent Defense Authorization Acts (Naval, 26).

Perhaps the greatest obstacle on the two-way street is the issue of burdensharing, which arises from the perception that "some countries (in the NATO alliance) may be doing more, or not doing enough, in contributing to collective security" (Lightburn, 26). The issue has often been couched in terms of each member's financial and military contribution to NATO expressed as a percentage of GNP/GDP. A recently completed study by NATO has explored the burdensharing problem.

The study, done in 1988, recognized that there were many factors, besides financial and military, that comprised a country's contributions to the alliance, and that these factors could not all be quantified or compared (Lightburn, 26). Nevertheless, an assessment for each country's total contribution was estimated and agreed upon by all other countries in the alliance (Lightburn, 27). As a result of these assessments, proposals were formulated to maintain the quality of the allied defence, to redress some deficiencies that the assessments discovered, and to enhance security in the future (Lightburn, 27-28):

In the first of these categories, . . . countries were asked to improve their performance in meeting NATO goals, to enhance the forces which are committed to the Alliance, to improve force sustainability, to continue to support commonly funded programmes, to strive for improved armaments cooperation, to provide more assistance to developing defence industry nations and to search for greater efficiencies in the defence area. In the second category, . . . countries were asked to consider

improvements to the NATO Composite Force for North Norway, to the Allied Command Europe (ACE) Mobile Force and to the on-call naval force in the Mediterranean, to improve where possible host country support arrangements, to enhance reinforcement capabilities and to improve the Alliance's airborne early warning capability. The third category challenged countries to look at a better rationalization of existing defence arrangements, to examine and improve the potential of reserve and mobilizable capabilities, and to explore other ways of enhancing security through additional common or joint funding of requirements (Lightburn, 28).

H. DOD SUPPORT OF ARMAMENTS COOPERATIONS

The Department of Defense has supported both Executive and Congressional efforts to further armaments cooperations. Directives are in place which form the basis of Defense Department policy on international armaments cooperation. Some key directives are listed below:

- DoD Directive 2000.9, "International Co-Production Projects and Agreements Between the United States and Other Countries or International Organizations," dated January 23, 1974.
- DoD Directive 3100.3, "Cooperation with Allies in Research and Development of Defense Equipment," dated September 27, 1963.
- DoD Directive 3100.4, "Harmonization of Qualitative Requirements for Defense Equipment of the United States and Allies," dated September 27, 1963.
- DoD Directive 5530.3, "International Agreements," dated June 11, 1987.

Directive 2000.9 is currently being revised; its revision would cancel the original 2000.9 and Directives 3100.3 and

3100.4, along with various memoranda issued by the Department. The draft revision proposes a ten-point DoD policy concerning international armaments cooperation; it says that it would be DoD policy that

- The DoD would cooperate with U. S. Allies in the research and development, testing and evaluation (RDT&E); production; procurement; sale and follow-on support of conventional defense equipment when such cooperation promotes U. S. foreign policy objectives; U. S. security interests; the fulfillment of validated operational requirements; an approach for integrating DoD's requirement generation, acquisition management, and planning, programming and budgeting systems; and the maintenance or improvement of the U. S. defense industrial base.
- The DoD would participate in cooperative programs that foster the collective security by encouraging participants to adopt interoperable equipment, compatible support arrangements, and common operational doctrine; by encouraging participants to invest appropriately in modern conventional defense; by making the most efficient use of the total scientific, technical, financial and industrial resources available to participants; and by fostering defense industrial capabilities in all participating countries to meet the military requirements of the alliance.
- The DoD would maximize its resources available for defense of the alliance by conserving DoD resources through access to those foreign defense goods and services that provide cost-effective alternatives for meeting U. S. operational requirements; and by facilitating the common defense of the alliance through promoting equitable access to the most cost effective goods, technology and services, reducing duplicate efforts at RDT&E, production and support, and by fostering a more efficient market for defense goods.
- The DoD would encourage consensus and validation of military requirements through treaties or agreements at the earliest practicable stage in the requirements' generation, and through all stages of the requirements' formulation.
- The DoD would authorize the release of classified or unclassified U. S. information and technology if such

disclosure was subject to a Technology Assessment Control Plan and if such disclosure complied with law and other DoD Directives.

- The DoD would protect and advance the U. S. industrial base in negotiating and implementing cooperative agreements by considering the effects of the agreements on the defense industrial base; and by interfacing with the Department of Commerce (DOC) regarding the implications of agreements on the industrial competitive position of U. S. industry.
- The DoD would prepare an industrial base factors analysis for each agreement to assess the defense industrial implications of cooperative agreements.
- The DoD would not encourage, enter directly into, or commit U. S. firms to any offset arrangement through a cooperative agreement except as directed by the President through the National Security Council.
- The DoD would maintain a consistent approach to cooperative agreements by negotiating and concluding all agreements in accordance with DoD Directive 5530.3 or the Security Assistance Management Manual, as applicable.
- The DoD would continually monitor and review cooperative programs to ensure consistency with U. S. interests and objectives, and would maintain a consolidated index of all cooperative agreements (Draft, 2-6).

DoD Directive 5530.3 "International Agreements" establishes the requirements for, and restrictions on, authority to negotiate or conclude an international agreement. The directive defines "international agreement" broadly as any agreement concluded with one or more foreign governments that is signed or agreed to by personnel of the U. S. Government, that signifies the intention of the parties to be bound in international law, and that is identified as an international agreement or other similar language (2-1). The definition

specifically excludes certain other official compacts made by Government personnel such as contracts made under the Federal Acquisition Regulations (FAR) and Foreign Military Sales (FMS) Credit Agreements (2-1). DoD Directive 5530.3 establishes standard procedures for requesting authority to negotiate or conclude international agreements, and assigns responsibility for that authority to the Under Secretary of Defense for Policy (USD(P)). For certain categories of agreements, the directive delegates authority to negotiate and conclude international agreements to the Service Secretaries, the Chairman of the Joint Chiefs of Staff (CJCS), the Director of the Defense Security Assistance Agency (DSAA), the Under Secretary of Defense for Acquisition (USD(A)), and others.

I. DON SUPPORT OF ARMAMENTS COOPERATION

In December, 1989, a Naval Research Advisory Committee (NRAC) Report on International Research and Development (NRAC Report No. 89-7) was completed. The committee panel was comprised of representatives from Government, private industry, and universities, and chaired by Mr. Gerald Cann, then of General Dynamics Corporation. The panel had been formed to address the following questions as they pertained to the Navy's international cooperative research and development (IR&D) programs:

- How may the Navy enhance identification and assessment of foreign technologies to facilitate both the rapid and long

term incorporation of these technologies into naval weapon systems?

- How may the Navy better identify potential cooperative development programs? What fundamental elements impact the success or failure of a cooperative development? Which elements should be considered in determining priority?
- What role can industry assume to facilitate international cooperative programs and take advantage of available foreign technologies? What is necessary to maximize industry involvement in these programs and strengthen the U. S. industrial base? How may IR&D funding be used in these programs?
- What incentives should be offered to promote international cooperative programs? How may the Navy reward program managers and industry for cost savings achieved through successful programs?
- How may international programs be used to promote the maritime strategy objectives of the Navy?
- How may the coordination and review of Navy international programs be improved? What organizational changes are necessary?
- Are the fiscal goals established by the OSD for service participation in international programs, practical and adequate?
- How will new legislation, requiring Department of Commerce review of all proposed international cooperative development Memoranda of Understanding (MOUs), impact Navy programs and U. S. industry (Naval, 15-16).

An immediate cause for the panel's formation was the fact that two ongoing cooperative programs had been recently cancelled and several others appeared to be in trouble (Naval, 3). Factors underlying the cancellations were readily discernible. These included changes in the external environment in which IR&D is conducted; the lack of a formal

national policy on international armaments cooperation; and the means by which armaments cooperative agreements are impacted by actions of Congress, the Department of Defense and the Department of the Navy (Naval, 3).

The panel recognized several trends in the external environment that impact on the Navy's IR&D efforts, central of which is the increasing "globalization of the economy, industry and trade. This, in turn, has fostered increasing interdependence among nations" (Naval, 21). The panel acknowledged an erosion in the United States' traditional

. . . leadership position in several important (technological) areas, such as microelectronics, ceramics and manufacturing process technology. Foreign capability in the design of integrated circuits, launch vehicles and commercial aircraft underscores the general trend toward technology leveling. As a result, intense competitive pressure has promoted widespread dual use of our most advanced technologies (Naval, 21).

A final environmental trend identified by the panel was the fact that our focus on the threats facing our nation was shifting from a military threat by the Soviet bloc to an economic threat by the other industrialized nations of the world, specifically the Pacific Rim nations and Western Europe (Naval, 21). The panel attributed industry's narrow

. . . preoccupation with short term profit and corporate book value (with putting) us at a distinct disadvantage in dealing with Japan's longer goal of securing market share (Naval, 21).

Concerning the Government's national policy on international armaments cooperation, the panel was quick to

point out that the Government has no formal national policy even though

. . . armaments cooperation with North Atlantic Treaty Organization (NATO) and other friendly countries has been an integral part of DoD's RDT&E and production procurement programs since World War II (Naval, 23).

Instead of a formal, written policy on international armaments cooperation, an ad hoc policy evolved "in accordance with the prevailing international views held by each administration" (Naval, 23).

The panel recognized that the Department of the Navy has generally followed OSD direction for international armaments cooperation by issuing SECNAV instructions that direct compliance with the relevant DoD Directives and by generating its own set of OPNAV instructions to provide guidelines for conducting MOU negotiations (Naval, 29). The NRAC panel did level some criticism at DoN for not being sufficiently sensitive to U. S. industrial base concerns and for the ultra-conservative position the Navy has traditionally taken regarding the licensing of its equipment for use and sales overseas (Naval, 30).

J. THE NAVY INTERNATIONAL PROGRAMS OFFICE (IPO)

Coordination of the Navy's international armaments cooperative efforts is accomplished by the International Programs Office (IPO), reporting to the Deputy Assistant Secretary of the Navy for International Policy (DASN(IP)). In

IPO, the Director for International Agreements is responsible for oversight of the acquisition MOUs, for assisting in the development and negotiations of MOUs by the Program Managers, and for policy coordination.

The IPO office traditionally, at regular intervals, issued a "call" for Candidate Nomination Proposals (CNPs) throughout the various Program Offices of the Navy. Offices whose programs were fully funded typically declined to submit CNPs while offices facing shortfalls and budget cuts proposed programs for MOU consideration.

Recent procedures established by DoD Instruction 5000.2, "Defense Acquisition Management Policies and Procedures," may lead to an increase in both the quantity and quality of candidate programs. The instruction requires that a report be submitted to Congress annually regarding international cooperative efforts. The report, the Cooperative Research and Development Projects Report, is prepared by the Deputy Under Secretary of Defense for International Programs (DUSD(IP)), and reviews Acquisition Category I (ACAT I), Major Defense Acquisition Programs, activity for the year (11-D-1-3). The report will provide Congress with two pieces of information:

- A description of status, funding and schedule of existing cooperative research and development projects for which a Memorandum of Understanding (or other formal agreement) has been entered into;
- A description of the purpose, funding and schedule of any proposed new projects included in the President's budget proposal for which a Memorandum of Understanding (or other formal agreement) has not been entered into (11-D-1-3).

The instruction also requires that a Cooperative Opportunities Document be included as Annex G to the Integrated Program Summary document as part of the Defense Acquisition Board (DAB) Milestones Review procedures (11-C-3). This requirement applies to all Acquisition Categories programs at Milestones I through IV; the Cooperative Opportunities Document would address the following areas:

- Are there any similar projects in development or production by one or more major allies of the United States?
- If yes, could that project satisfy, or be modified in scope so as to satisfy, the military requirements of the United States?
- What are the advantages and disadvantages of seeking to structure a cooperative development program with one or more Allied nations?
- What alternate forms of cooperation could be appropriate for this project (DoD Manual 5000.2M, 4-H-1-1 and -2)?

The IP Office also targets likely MOU prospects through the annual Planning, Programming and Budgeting System (PPBS) review process, during which the office focuses primarily on mid-level programs (ACAT II programs, the lower range of ACAT I programs, and the upper range of ACAT III programs).

Once the IP Office identifies a candidate cooperative program, either through a successful PPBS targeting or a call for candidate programs, the office discusses the program with the originator to assess the program's potential as a cooperative agreement. For programs with significant

potential, the originator drafts and submits a Project Nomination Proposal (PNP) to the IPO. The IPO then performs the "quick look" evaluation that is the subject of this research; those proposals evaluated likely to succeed are forwarded for notification to the Deputy Assistant Secretary of the Navy for International Policy (DASN(IP)). The DASN(IP) either sends the PNP back to IPO with feedback or submits the PNP to the Assistant Secretary of the Navy for Research, Development and Acquisition (ASN(RD&A)) for approval to Request Authority to Negotiate (RAN). Once ASN(RD&A) approval is obtained, the IPO submits the PNP to the USD(A) for authority to negotiate in accordance with DoD Directive 5530.3.

III. PRESENTATION OF DATA

A. BACKGROUND TO THE DEVELOPMENT OF SUCCESS CRITERIA

1. Original Evaluation Procedure

The IP Office originally used the following 20-point checklist to evaluate Project Nomination Proposals:

- **MOU REQUIREMENT.** Why must a MOU be employed? Is use of a MOU based on legal or policy grounds? Would use of another international program mechanism (e.g., FMS LOA, export license, etc.) achieve the same objectives?
- **LEGAL.** If a MOU is required, which statute(s) provide authority for the MOU? More specifically, what is the statutory authority for each of the obligations undertaken by the U. S. Government in the MOU?
- **NUMBER OF PARTICIPANTS.** How many nations desire to participate in the MOU? (Note that in general, bilateral agreements are encouraged.)
- **MOU SCHEDULE.** Can authority to negotiate be obtained and can a MOU be negotiated and concluded in time to meet desired program schedule(s)?
- **PROGRAM OBJECTIVE.** Is the objective of the MOU clearly stated? What is the motivation and benefit to the U. S. Government? What is the perceived motivation and benefit to the foreign government(s)? (Note that the combination of the two must create a "win-win" situation in order for the program to succeed.)
- **PROGRAM REQUIREMENT.** Is there a documented U. S. requirement which has:
 - OPNAV support and/or approval?
 - CINC/JCS support and/or approval?
 - SYSCOM/Lab support and/or approval?
 - RD&A support and/or approval?
 - OSD support and/or approval?
 - Congressional support and/or approval?

- Is the combined U. S.-foreign requirement clearly stated in the MOU, and does it realistically reflect the needs of all parties?
- PROGRAM SCOPE OF WORK. Are proposed program tasks and associated schedules clearly stated? Will they achieve program objectives and meet program requirements in the areas of technical performance, cost and schedule?
- MANAGEMENT. Will this be a U. S. managed project, a foreign country managed project, or a jointly managed project? What is the management hierarchy (steering groups, program offices, etc.)? Will the program office(s) be integrated or not?
- FINANCIAL. What is the total cost of the project (financial and non-financial)? What is the U. S. share (financial/non-financial) versus the foreign share? What is the United States/foreign cost share rationale (production off-take, equal share, etc.), and are the contributions versus benefits equitable? What are the U. S. sources of funds/non-financial contributions? If DoN funds, are they in the budget/POM? If Nunn funds, have they been approved by DoN/OSD? If NRC waiver(s) are proposed, have they been approved by DoN/OSD and/or foreign governments involved?
- CURRENCY. Will the program be managed in U. S. dollars, foreign currency, or a mix? Will the establishment of a joint program bank account be required?
- CONTRACTUAL ARRANGEMENTS. Will U. S. contractual procedures be used or not? Who will serve as the U. S. contracting agency (if applicable)? What type of contract (FFP, CPIF, etc.) will be employed? Are there any special arrangements or procedures? If so, are they in accordance with the FAR?
- WORK-SHARE. If a cooperative MOU, what is the anticipated division of work-share among participants, by volume and by type (high tech, low tech)? Does the proposed work-share align with cost-share (i. e. is it equitable)?
- OFFSET AGREEMENTS. Are there industrial offset agreements addressed in the MOU that are associated with this program? Will the U. S. Government play a role? Is that role consistent with DoD policy on offsets?
- INDUSTRIAL BASE IMPACT. What will be the impact on the U. S. industrial base (including sub-tier suppliers) of proposed work-share/offset agreements?

- INTELLECTUAL PROPERTY RIGHTS. What background and foreground data rights are anticipated to be transferred to foreign participants? Do U. S. rights align with U. S. contributions? (Note that for substantial U. S. contributions, we should obtain a greater degree of data rights than our prospective partners.)
- TECHNOLOGY TRANSFER. Are sensitive technologies to be shared or transferred? Have such transfers been cleared through DoN and OSD (DTSA)? Is TTSARB approval required? Has disclosure guidance to the negotiating team been developed and issued? Has a Delegation of Disclosure Letter (DDL) to the Program Manager (PM) been issued?
- DISCLOSURE OF CLASSIFIED INFORMATION. Will U. S. classified information or material be disclosed to foreign nationals during the course of the program? Is approval by the National Disclosure Policy Committee (NDPC) required? (Note that both technology transfer and disclosure of CMI should be addressed in the MOU negotiating guidance and DDL.)
- THIRD PARTY SALES AND TRANSFERS. Will future U. S. disclosures require concurrence of other participants? (Note that if the U. S. possesses considerable "background equity" in the program, permitting foreign "veto" of potential U. S. sales should be avoided.)
- MOU CLARITY. Does the MOU clearly state the arrangements listed above or are they to be documented by side agreements?
- REQUIRED DOCUMENTATION. Have the following supporting documents been prepared: Legal Memorandum; Fiscal Memorandum, Technology Security Risk Assessment (or its successor, Technology Assessment and Control Plan); Industrial Base Factors Analysis?

The IP Office halted use of the checklist since it offered an entirely subjective overview and since it could not provide a methodology for comparing one PNP to another.

2. OSD Decision Matrix

The IP Office considered adopting the following four-part decision matrix used by the Office of the Secretary of Defense for selecting programs to pursue among those nominated for international research and development projects:

SUITABILITY FOR COLLABORATION	HIGH (9 PTS) RED	MEDIUM (4 PTS) YELLOW	LOW (1 PT) GREEN
1. STATUS OF MOU	SIGNED	IN PROCESS	PROCESS NOT YET STARTED
2. LIKELIHOOD OF FOREIGN SUPPORT OR COMMITMENT	CONSISTENT WITH FOREIGN APPROACHES TO DEFENSE	REQUIRES SOME CHANGE IN APPROACH	REQUIRES RADICAL DEPARTURE IN APPROACH OR NEW POLICY
3. SIMILARITY WITH ONGOING PROJECT	INCORPORATES MAJOR ONGOING PROJECT	INCORPORATES SOME ELEMENTS OF ONGOING RDT&E	REQUIRES TERMINATION OR REDUCTION OF ONGOING PROJECT
4. LIKELIHOOD OF SUCCESS IN COLLABORATION	U. S. AND ALLIES ARE ON SAME SCHEDULE	SIMILAR SCHEDULE	VERY DIFFERENT SCHEDULES
A. TIMING			
B. COSTS	COULD RADICALLY REDUCE COST	MODERATE INFLUENCE	LITTLE IMPACT
C. TECHNOLOGY SHARING	POTENTIAL FOR SIGNIFICANT SAVINGS	POTENTIAL FOR MODERATE SAVINGS	LITTLE POTENTIAL FOR SAVINGS
D. SECURITY	UNCLASSIFIED NO SENSITIVE TECHNOLOGY OR SYSTEMS	CONFIDENTIAL MODERATELY SENSITIVE TECHNOLOGY OR SYSTEMS	SECRET; VERY SENSITIVE TECHNOLOGY OR SYSTEMS

SUITABILITY FOR COLLABORATION	HIGH (9 PTS) RED	MEDIUM (4 PTS) YELLOW	LOW (1 PT) GREEN
E. RATIONALIZATION, STANDARDIZATION, INTEROPERABILITY (RSI)	SUPPORTS AREAS WHERE RSI IS CRUCIAL	SUPPORTS AREAS WHERE RSI IS MODERATELY IMPORTANT	SUPPORTS AREA WHERE RSI IS NOT VERY IMPORTANT
5. DEFENSE INDUSTRIAL BASE IMPACT			
A. ACCESS TO UNIQUE FOREIGN ASSETS	PROVIDES SIGNIFICANT ACCESS TO KEY FOREIGN ASSETS	MODERATE ACCESS	LITTLE OR NO ACCESS
B. ACCESS TO UNIQUE U. S. ASSETS	PROVIDES LITTLE OR NO ACCESS TO KEY U. S. ASSETS	MODERATE ACCESS	SIGNIFICANT ACCESS
C. IMPACT ON U. S. PRODUCTION LEVELS (<5 YEARS)	SUPPORTS EFFICIENT U. S. PRODUCTION LEVELS	LITTLE OR NO IMPACT	UNDERCUTS U. S. PRODUCTION LEVELS
D. IMPACT ON U. S. PRODUCTION LEVELS (>5 YEARS)	SUPPORTS EFFICIENT U. S. PRODUCTION LEVELS	LITTLE OR NO IMPACT	UNDERCUTS U. S. PRODUCTION LEVELS
E. IMPACT ON U. S. TECHNOLOGICAL LEAD	ENHANCES U. S. LEAD IN MANTECH	LITTLE OR NO IMPACT	DEGRADES U. S. LEAD IN MANTECH

POTENTIAL TO REDRESS CONVENTIONAL FORCE DEFICIENCY	HIGH (9 PTS) RED	MEDIUM (4 PTS) YELLOW	LOW (1 PT) GREEN
1. NEW CONVENTIONAL DEFENSE CAPABILITY	GIVES CAPABILITY TO REDRESS SHORT TERM IMBALANCE	REDRESSES LONG TERM IMBALANCE	PROVIDES INCREMENTAL IMPROVEMENT IN NATO/ ALLIED CAPABILITY
2. MEETS U. S. OPERATIONAL REQUIREMENT	SIGNED JCS AND SERVICE REQUIREMENT	REQUIREMENT IN REVIEW	NO FORMAL REQUIREMENT EXISTS

POTENTIAL TO RE-DRESS CONVENTIONAL FORCE DEFICIENCY	HIGH (9 PTS) RED	MEDIUM (4 PTS) YELLOW	LOW (1 PT) GREEN
3. ADDRESSES FORMAL NATO/ALLIED DEFICIENCY	FORMALLY APPROVED REQUIREMENT	LINKED TO DEFICIENCIES IN NATO CMF OR OTHER FORMAL DOCUMENT	WEAK LINKAGE TO FORMAL DOCUMENT

PRIORITY WITHIN SERVICE/AGENCY	HIGH (9 PTS) RED	MEDIUM (4 PTS) YELLOW	LOW (1 PT) GREEN
1. LIKELIHOOD OF FOLLOW-ON ACQUISITION	MEETS VERY HIGH PRIORITY SERVICE/AGENCY OBJECTIVE	MEETS MODERATE PRIORITY OBJECTIVE	GENERALLY SUPPORTIVE OF OBJECTIVES
2. PLANNED COMMITMENT TO PROCUREMENT	SOLIDLY IN LONG TERM PLANS	MODERATE LEVEL OF LONG TERM COMMITMENT	NOT YET INCORPORATED IN LONG TERM PLANS
3. WILLINGNESS TO FUND "PRE-MOU" COSTS	SERVICE/AGENCY WILL COVER ALL SUCH COSTS	SERVICE/AGENCY WILL COVER ONLY PART OF COSTS	SERVICE/AGENCY WILL NOT COVER SUCH COSTS
4. STATUS OF U. S. PROJECT	WELL ESTABLISHED	---	NEW
5. WILLINGNESS TO USE U. S. FACILITIES	WILLING TO COMMIT KEY FACILITIES	MAY COMMIT KEY FACILITIES	NOT WILLING TO COMMIT KEY FACILITIES

SUPPORT IN FIVE-YEAR DEFENSE PLAN	HIGH (9 PTS) RED	MEDIUM (4 PTS) YELLOW	LOW (1 PT) GREEN
1. SUPPORT IN SERVICE POM	CONTAINED IN SERVICE POM	COMMITMENT TO PUT IN POM LATER	NO COMMITMENT YET
2. SUPPORT IN FOREIGN BUDGET	CONTAINED IN FOREIGN BUDGET	COMMITMENT TO PUT IN FOREIGN BUDGET	NO COMMITMENT YET

Though the OSD evaluation format did allow for a quantitative comparison of one candidate program to another, the IP Office decided not to adopt the OSD format because it did not adequately consider the point of view of the foreign participants in the MOU. Their experience with MOUs convinced the IP Office that the key to the success of an MOU was the "degree of convergence" between the U. S. decision factors and the foreign decision factors; a high degree of convergence indicated a synergism at work in the MOU that helped ensure a successful program.

B. INITIAL SUCCESS CRITERIA EVALUATION

1. U. S./Foreign Evaluation Criteria

On October 5, 1990, the IP Office developed the following weighted criteria by which a candidate program could be evaluated:

I. LEVEL OF COMMITMENT:	10	5	1
- CONGRESS/ EQUIVALENT	LEGISLATION	MEMBER/STAFF	NO INTEREST
- OSD/MOD	USD (A) UP	DUSD/ASD UP	WORKING LEVEL
- SERVICE/ EQUIVALENT	ASN (RDA) UP	SPONSOR SYSCOM/PEO	WORKING LEVEL

II. PROGRAMMATIC FACTORS	10	5	1
- PROGRAM OBJECTIVE	MAJOR SYSTEM FLEET DELIVERY	OTHER SYSTEM FLEET DELIVERY	TECHBASE AND/OR STUDIES
- MILITARY REQUIREMENTS	APPROVED OR	APPROVED TOR	INTENT/ NO OR REQUIRED
- ALLIANCE REQUIREMENTS	APPROVED NATO OUTLINE STAFF TARGET	APPROVED NATO MISSION NEED EVALUATION	INTENT TO DEVELOP
- MOU/PROGRAM SCHEDULES	NO MOU/ PROGRAM SCHEDULE PROBLEMS	CONSTRAINED MOU/PROGRAM SCHEDULES	MAJOR SCHEDULE DISCONNECT
- INDUSTRIAL BASE IMPACT	ENHANCES U. S. INDUSTRIAL BASE	NO IMPACT ON U. S. INDUSTRIAL BASE	NEGATIVE U. S. INDUSTRIAL BASE IMPACT
- 3RD PARTY SALES OBJECTIVES	DESIRE BROAD SALES	DESIRE SELECTED SALES	DESIRE NO SALES

III. ABILITY TO CONTRIBUTE	10	5	1
- FUNDING	FULLY FUNDED IN POM	PARTIALLY FUNDED IN POM	INTENT TO POM
- GOVERNMENT TECHNOLOGY	FULL SYSCOM/ LAB SUPPORT	PARTIAL SYSCOM/LAB SUPPORT	SYSCOM/LAB RESOURCE PROBLEMS
- INDUSTRY TECHNOLOGY	FULL INDUS-TRY SUPPORT/ TECHNOLOGY AVAILABLE	PARTIAL SUPPORT/ TECHNOLOGY AVAILABLE	INDUSTRIAL SUPPORT/ TECHNOLOGY PROBLEMS
- TECHNOLOGY TRANSFER	NO TECH TRANSFER ISSUES	SELECTED TECH TRANS- FER ISSUES	MAJOR TECH TRANSFER ISSUES
- SECURITY	LOW RISK	MEDIUM RISK	HIGH RISK

2. Five-step Evaluation Method

Using the above criteria, the IP office conducted the following five-step evaluation process on each Project Nomination Proposal:

- Establish initial U. S. "Strength Rating" based on evaluation of proposed program vis-a-vis IP "program success" indicators.
- Analyze Foreign Intentions/Capabilities in a similar manner.
- Compare results of the first two steps to "match up" U. S./Foreign strengths/weaknesses. Since U. S. and foreign factors can either support, neutralize, or conflict with each other, the initial U. S. "Strength Rating" may be positively or negatively affected by the degree of convergence between the U. S. and Foreign intentions and capabilities.
- Qualitatively determine the proposed program's "Probability of Success" and "Payoff Potential" if program is successful.
- Develop a consolidated priority listing which takes into account the program's quantitative "Composite Strength Rating," and qualitative "Probability of Success" and "Payoff Potential" assessments.

The individual criteria for each area (Level of Commitment, Programmatic Factors, Ability to Contribute) were assigned values from one to ten; an average for each area was then determined and multiplied by a predetermined weight (0.75, 1.5, and 1.0 for Level of Commitment, Programmatic Factors, and Ability to Contribute, respectively) to arrive at

an area "Strength Rating." Area strength ratings for both the United States and the foreign participants were compared, summed and multiplied by a second weight to arrive at a composite area strength rating. This second weight (ranging in multiples of 0.25 from 0.50 to 1.50) was subjectively determined by the IP Office by aligning the individual criteria under each U. S. area with their foreign counterparts. If a positive degree of convergence existed for an area, the weight would be a value greater than one. A value of one was assigned for a neutral degree of convergence, and a value less than one was assigned for a negative degree of convergence. These composite area strength ratings were then summed to determine the final composite value by which programs would be ranked.

3. Initial Application Of Evaluation Criteria and Method

a. Programs Evaluated

The following programs were initially evaluated; the short titles in parentheses are for cross-referencing purposes:

PROGRAM TITLE	FOREIGN PARTICIPANTS
NATO MECHANICAL MINESWEEPING SYSTEM (NMMS)	FRANCE, NETHERLANDS, SPAIN, ITALY
ANTI-SHIP MISSILE COUNTERMEASURES (ASMCM)	UNITED KINGDOM
"SPINNAKER" (SPIN)	CANADA
U. S. PACOM COMBINED INTEROPERABILITY PROGRAM (CIP)	AUSTRALIA, SOUTH KOREA, JAPAN
NATO CSNI (CSNI)	UNITED KINGDOM, FRANCE, NETHERLANDS, CANADA
CONTINUOUS PROCESSING OF SOLID PROPELLANTS (C2P2)	FRANCE

b. Evaluation Sheets

The individual evaluation sheets for the above programs are recreated on the following six pages. Although the format of these recreations differs slightly from the originals due to software limitations, the data and general sense of the evaluations remain true to the originals.

PROGRAM SHORT TITLE: NMMS

UNITED STATES

Level of Commitment (0.75)

-Congress	1
-OSD	3
-Service	8
-Strength Rating	3.00

FOREIGN

Level of Commitment (0.75)

-Legislature	1
-MOD	6
-Service/Equiv.	9
-Strength Rating	4.00

Degree of Convergence Weight: 1.0

Programmatic Factors (1.5)

-Program Objective	4
-Military Reqmts	10
-Alliance Reqmts	10
-MOU/Program Schedules	5
-Industrial Base Impact	5
-3rd Party Sales Objectives	5
-Strength Rating	9.75

Programmatic Factors (1.5)

-Program Objective	4
-Military Reqmts	10
-Alliance Reqmts	10
-MOU/Program Schedules	5
-Industrial Base Impact	5
-3rd Party Sales Objectives	5
-Strength Rating	9.75

Degree of Convergence Weight: 1.25

Ability to Contribute (1.0)

-Funding	10
-Government Technology	10
-Industry Technology	8
-Technology Transfer	10
-Security	NA
-Strength Rating	9.50

Ability to Contribute (1.0)

-Funding	10
-Government Technology	10
-Industry Technology	8
-Technology Transfer	10
-Security	5
-Strength Rating	8.60

Degree of Convergence Weight: 1.5

U. S. Strength 22.25

Foreign Strength 22.35

Probability of Success: Medium-High

Payoff Potential: Medium-High

COMPOSITE STRENGTH 58.53

PROGRAM SHORT TITLE: ASMCM

UNITED STATES

Level of Commitment (0.75)

-Congress	1
-OSD	1
-Service	6
-Strength Rating	2.00

FOREIGN

Level of Commitment (0.75)

-Legislature	1
-MOD	3
-Service/Equiv.	5
-Strength Rating	2.25

Degree of Convergence Weight: 1.0

Programmatic Factors (1.5)

-Program Objective	7
-Military Req'm'ts	10
-Alliance Req'm'ts	NA
-MOU/Program Schedules	10
-Industrial Base Impact	5
-3rd Party Sales Objectives	NA
-Strength Rating	12.00

Programmatic Factors (1.5)

-Program Objective	7
-Military Req'm'ts	5
-Alliance Req'm'ts	NA
-MOU/Program Schedules	10
-Industrial Base Impact	5
-3rd Party Sales Objectives	NA
-Strength Rating	10.13

Degree of Convergence Weight: 1.25

Ability to Contribute (1.0)

-Funding	7
-Government Technology	10
-Industry Technology	NA
-Technology Transfer	5
-Security	NA
-Strength Rating	7.33

Ability to Contribute (1.0)

-Funding	7
-Government Technology	10
-Industry Technology	NA
-Technology Transfer	5
-Security	10
-Strength Rating	8.00

Degree of Convergence Weight: 1.5

U. S. Strength 21.33

Foreign Strength 20.38

Probability of Success: High-High

Payoff Potential: High-High

COMPOSITE STRENGTH 54.91

PROGRAM SHORT TITLE: SPIN

UNITED STATES

Level of Commitment (0.75)

-Congress	1
-OSD	3
-Service	8
-Strength Rating	3.00

FOREIGN

Level of Commitment (0.75)

-Legislature	1
-MOD	5
-Service/Equiv.	8
-Strength Rating	3.50

Degree of Convergence Weight: 1.0

Programmatic Factors (1.5)

-Program Objective	6
-Military Req'm'ts	10
-Alliance Req'm'ts	NA
-MOU/Program Schedules	9
-Industrial Base Impact	5
-3rd Party Sales Objectives	NA
-Strength Rating	11.25

Programmatic Factors (1.5)

-Program Objective	6
-Military Req'm'ts	10
-Alliance Req'm'ts	NA
-MOU/Program Schedules	9
-Industrial Base Impact	5
-3rd Party Sales Objectives	NA
-Strength Rating	11.25

Degree of Convergence Weight: 1.25

Ability to Contribute (1.0)

-Funding	10
-Government Technology	8
-Industry Technology	5
-Technology Transfer	7
-Security	NA
-Strength Rating	7.50

Ability to Contribute (1.0)

-Funding	10
-Government Technology	8
-Industry Technology	5
-Technology Transfer	7
-Security	10
-Strength Rating	8.00

Degree of Convergence Weight: 1.25

U. S. Strength 21.75

Foreign Strength 22.75

Probability of Success: Medium-High

Payoff Potential: High-High

COMPOSITE STRENGTH 54.00

PROGRAM SHORT TITLE: CIP

UNITED STATES

Level of Commitment (0.75)

-Congress	1
-OSD	8
-Service	7
-Strength Rating	4.00

FOREIGN

Level of Commitment (0.75)

-Legislature	1
-MOD	8
-Service/Equiv.	9
-Strength Rating	4.50

Degree of Convergence Weight: 1.0

Programmatic Factors (1.5)

-Program Objective	5
-Military Reqm'ts	8
-Alliance Reqm'ts	NA
-MOU/Program Schedules	10
-Industrial Base Impact	5
-3rd Party Sales Objectives	NA
-Strength Rating	10.50

Programmatic Factors (1.5)

-Program Objective	5
-Military Reqm'ts	8
-Alliance Reqm'ts	NA
-MOU/Program Schedules	10
-Industrial Base Impact	5
-3rd Party Sales Objectives	NA
-Strength Rating	10.50

Degree of Convergence Weight: 1.25

Ability to Contribute (1.0)

-Funding	5
-Government Technology	8
-Industry Technology	NA
-Technology Transfer	8
-Security	NA
-Strength Rating	7.00

Ability to Contribute (1.0)

-Funding	9
-Government Technology	8
-Industry Technology	NA
-Technology Transfer	8
-Security	10
-Strength Rating	8.75

Degree of Convergence Weight: 1.0

U. S. Strength 21.50

Foreign Strength 23.75

Probability of Success: Medium-High

Payoff Potential: Medium-High

COMPOSITE STRENGTH 50.50

PROGRAM SHORT TITLE: CSNI

UNITED STATES

Level of Commitment (0.75)

-Congress	3
-OSD	4
-Service	6
-Strength Rating	3.25

FOREIGN

Level of Commitment (0.75)

-Legislature	2
-MOD	5
-Service/Equiv.	6
-Strength Rating	3.25

Degree of Convergence Weight: 1.0

Programmatic Factors (1.5)

-Program Objective	1
-Military Req'm'ts	2
-Alliance Req'm'ts	10
-MOU/Program Schedules	8
-Industrial Base Impact	5
-3rd Party Sales Objectives	NA
-Strength Rating	7.80

Programmatic Factors (1.5)

-Program Objective	3
-Military Req'm'ts	3
-Alliance Req'm'ts	10
-MOU/Program Schedules	8
-Industrial Base Impact	5
-3rd Party Sales Objectives	NA
-Strength Rating	8.70

Degree of Convergence Weight: 1.25

Ability to Contribute (1.0)

-Funding	5
-Government Technology	10
-Industry Technology	NA
-Technology Transfer	10
-Security	NA
-Strength Rating	8.33

Ability to Contribute (1.0)

-Funding	10
-Government Technology	10
-Industry Technology	NA
-Technology Transfer	10
-Security	5
-Strength Rating	8.75

Degree of Convergence Weight: 1.25

U. S. Strength 19.38

Foreign Strength 20.70

Probability of Success: Medium-High

Payoff Potential: Medium-Medium

COMPOSITE STRENGTH 48.48

PROGRAM SHORT TITLE: C2P2

UNITED STATES

Level of Commitment (0.75)

-Congress	1
-OSD	2
-Service	4
-Strength Rating	1.75

FOREIGN

Level of Commitment (0.75)

-Legislature	1
-MOD	4
-Service/Equiv.	6
-Strength Rating	2.75

Degree of Convergence Weight: 1.0

Programmatic Factors (1.5)

-Program Objective	1
-Military Reqmts	1
-Alliance Reqmts	NA
-MOU/Program Schedules	6
-Industrial Base Impact	10
-3rd Party Sales Objectives	NA
-Strength Rating	6.75

Programmatic Factors (1.5)

-Program Objective	1
-Military Reqmts	1
-Alliance Reqmts	NA
-MOU/Program Schedules	6
-Industrial Base Impact	10
-3rd Party Sales Objectives	NA
-Strength Rating	6.75

Degree of Convergence Weight: 1.0

Ability to Contribute (1.0)

-Funding	2
-Government Technology	10
-Industry Technology	7
-Technology Transfer	8
-Security	NA
-Strength Rating	6.75

Ability to Contribute (1.0)

-Funding	8
-Government Technology	10
-Industry Technology	7
-Technology Transfer	8
-Security	5
-Strength Rating	7.60

Degree of Convergence Weight: 1.25

U. S. Strength 15.25

Foreign Strength 17.10

Probability of Success: Medium-Medium

Payoff Potential: Medium-High

COMPOSITE STRENGTH 35.94

c. Results of Initial Application

The following table summarizes the results of this initial evaluation:

PROGRAM NAME	COMPOSITE STRENGTH RATING	U. S. STRENGTH RATING	FOREIGN STRENGTH RATING	PROBABIL-ITY OF SUCCESS	PAYOFF POTEN-TIAL
NMMS	58.53	22.25	22.35	MEDIUM-HIGH	HIGH
ASMCM	54.91	21.33	20.38	HIGH	HIGH
SPIN	54.00	21.75	22.75	MEDIUM-HIGH	HIGH
CIP	50.50	21.50	23.75	MEDIUM-HIGH	MEDIUM-HIGH
CSNI	48.48	19.38	20.70	MEDIUM-HIGH	MEDIUM
C2P2	35.94	15.25	17.10	MEDIUM	MEDIUM-HIGH

4. Second Application of Evaluation Criteria and Method

a. Programs Evaluated

An additional 12 programs were evaluated later in the same fiscal year. These programs are listed below:

PROGRAM TITLE	FOREIGN PARTICIPANTS
REMOTE SENSING UNIT WITH SYNTHETIC APERTURE RADAR (RSU)	NORWAY, UNITED KINGDOM
AIRBORNE ELECTROMAGNETIC SENSOR (AES)	CANADA
TACTICAL LIGHTWEIGHT SURVEILLANCE SATELLITE (TLSS)	AUSTRALIA
TACTICAL TARGET SUPPORT (TTS)	AUSTRALIA
DISTRIBUTED TACTICAL SURVEILLANCE (DTS)	UNITED KINGDOM
TACTICAL SHIP SURVEILLANCE (TSS)	UNITED KINGDOM
OCEANOGRAPHY COOPERATION (OC-J)	JAPAN
OCEANOGRAPHY COOPERATION (OC-N)	NORWAY
OCEAN COLOR ASSESSMENT, G-I-N SEA (OCA-G)	UNITED KINGDOM, NORWAY, ICELAND, DENMARK
OCEAN COLOR ASSESSMENT, MEDITERRANEAN SEA (OCA-M)	UNITED KINGDOM, NORWAY, ICELAND, DENMARK
MILLIMETER WAVE SEA SURVEILLANCE (MWSS)	GERMANY, UNITED KINGDOM
REMOTE SPECTROMETRY RESEARCH (RSR)	CANADA, UNITED KINGDOM

b. Evaluation Sheets

The following pages replicate the evaluation sheets resulting from this second application of the success criteria and 5-step evaluation method to candidate programs:

PROGRAM SHORT TITLE: RSU

UNITED STATES

Level of Commitment (0.75)

-Congress	1
-OSD	1
-Service	8
-Strength Rating	2.50

FOREIGN

Level of Commitment (0.75)

-Legislature	1
-MOD	1.
-Service/Equiv.	8
-Strength Rating	2.50

Degree of Convergence Weight: 1.0

Programmatic Factors (1.5)

-Program Objective	5
-Military Reqmts	10
-Alliance Reqmts	5
-MOU/Program Schedules	7
-Industrial Base Impact	5
-3rd Party Sales Objectives	NA
-Strength Rating	9.60

Programmatic Factors (1.5)

-Program Objective	5
-Military Reqmts	10
-Alliance Reqmts	5
-MOU/Program Schedules	7
-Industrial Base Impact	5
-3rd Party Sales Objectives	NA
-Strength Rating	9.60

Degree of Convergence Weight: 1.25

Ability to Contribute (1.0)

-Funding	7
-Government Technology	9
-Industry Technology	10
-Technology Transfer	10
-Security	NA
-Strength Rating	9.00

Ability to Contribute (1.0)

-Funding	5
-Government Technology	9
-Industry Technology	10
-Technology Transfer	10
-Security	10
-Strength Rating	8.80

Degree of Convergence Weight: 1.25

U. S. Strength 21.10

Foreign Strength 20.90

Probability of Success: Medium-High

Payoff Potential: Medium-High

COMPOSITE STRENGTH 51.25

PROGRAM SHORT TITLE: AES

UNITED STATES

Level of Commitment (0.75)

-Congress	1
-OSD	1
-Service	4
-Strength Rating	1.50

FOREIGN

Level of Commitment (0.75)

-Legislature	1
-MOD	1
-Service/Equiv.	5
-Strength Rating	1.75

Degree of Convergence Weight: 1.0

Programmatic Factors (1.5)

-Program Objective	3
-Military Reqmts	3
-Alliance Reqmts	NA
-MOU/Program Schedules	10
-Industrial Base Impact	4
-3rd Party Sales Objectives	NA
-Strength Rating	7.50

Programmatic Factors (1.5)

-Program Objective	3
-Military Reqmts	3
-Alliance Reqmts	NA
-MOU/Program Schedules	10
-Industrial Base Impact	4
-3rd Party Sales Objectives	NA
-Strength Rating	7.50

Degree of Convergence Weight: 1.25

Ability to Contribute (1.0)

-Funding	7
-Government Technology	10
-Industry Technology	10
-Technology Transfer	10
-Security	NA
-Strength Rating	9.25

Ability to Contribute (1.0)

-Funding	7
-Government Technology	10
-Industry Technology	10
-Technology Transfer	10
-Security	10
-Strength Rating	9.40

Degree of Convergence Weight: 1.25

U. S. Strength 18.25

Foreign Strength 18.65

Probability of Success: Medium-High

Payoff Potential: Medium

COMPOSITE STRENGTH 45.31

PROGRAM SHORT TITLE: TLSS

UNITED STATES

Level of Commitment (0.75)

-Congress	1
-OSD	1
-Service	5
-Strength Rating	1.75

FOREIGN

Level of Commitment (0.75)

-Legislature	1
-MOD	1.
-Service/Equiv.	5
-Strength Rating	1.75

Degree of Convergence Weight: 1.0

Programmatic Factors (1.5)

-Program Objective	7
-Military Req'm'ts	1
-Alliance Req'm'ts	7
-MOU/Program Schedules	10
-Industrial Base Impact	7
-3rd Party Sales Objectives	NA
-Strength Rating	9.60

Programmatic Factors (1.5)

-Program Objective	7
-Military Req'm'ts	1
-Alliance Req'm'ts	7
-MOU/Program Schedules	10
-Industrial Base Impact	4
-3rd Party Sales Objectives	NA
-Strength Rating	8.70

Degree of Convergence Weight: 1.25

Ability to Contribute (1.0)

-Funding	2
-Government Technology	10
-Industry Technology	10
-Technology Transfer	5
-Security	NA
-Strength Rating	6.75

Ability to Contribute (1.0)

-Funding	2
-Government Technology	10
-Industry Technology	4
-Technology Transfer	5
-Security	10
-Strength Rating	6.20

Degree of Convergence Weight: 1.25

U. S. Strength 18.10

Foreign Strength 16.65

Probability of Success: Medium-High

Payoff Potential: Medium-High

COMPOSITE STRENGTH 42.56

PROGRAM SHORT TITLE: TTS

UNITED STATES

Level of Commitment (0.75)

-Congress	1
-OSD	1
-Service	5
-Strength Rating	1.75

FOREIGN

Level of Commitment (0.75)

-Legislature	1
-MOD	1
-Service/Equiv.	5
-Strength Rating	1.75

Degree of Convergence Weight: 1.0

Programmatic Factors (1.5)

-Program Objective	5
-Military Req'm'ts	2
-Alliance Req'm'ts	7
-MOU/Program Schedules	8
-Industrial Base Impact	6
-3rd Party Sales Objectives	NA
-Strength Rating	8.40

Programmatic Factors (1.5)

-Program Objective	5
-Military Req'm'ts	2
-Alliance Req'm'ts	7
-MOU/Program Schedules	8
-Industrial Base Impact	6
-3rd Party Sales Objectives	NA
-Strength Rating	8.40

Degree of Convergence Weight: 1.25

Ability to Contribute (1.0)

-Funding	1
-Government Technology	10
-Industry Technology	10
-Technology Transfer	5
-Security	NA
-Strength Rating	6.50

Ability to Contribute (1.0)

-Funding	1
-Government Technology	10
-Industry Technology	10
-Technology Transfer	5
-Security	10
-Strength Rating	7.20

Degree of Convergence Weight: 1.25

U. S. Strength 16.65

Foreign Strength 17.35

Probability of Success: Medium-High

Payoff Potential: Medium

COMPOSITE STRENGTH 41.63

PROGRAM SHORT TITLE: DTS

UNITED STATES

Level of Commitment (0.75)

-Congress	1
-OSD	1
-Service	5
-Strength Rating	1.75

FOREIGN

Level of Commitment (0.75)

-Legislature	1
-MOD	1
-Service/Equiv.	5
-Strength Rating	1.75

Degree of Convergence Weight: 1.0

Programmatic Factors (1.5)

-Program Objective	2
-Military Req'm'ts	10
-Alliance Req'm'ts	NA
-MOU/Program Schedules	7
-Industrial Base Impact	5
-3rd Party Sales Objectives	NA
-Strength Rating	9.00

Programmatic Factors (1.5)

-Program Objective	2
-Military Req'm'ts	10
-Alliance Req'm'ts	NA
-MOU/Program Schedules	7
-Industrial Base Impact	5
-3rd Party Sales Objectives	NA
-Strength Rating	9.00

Degree of Convergence Weight: 1.00

Ability to Contribute (1.0)

-Funding	5
-Government Technology	8
-Industry Technology	5
-Technology Transfer	10
-Security	NA
-Strength Rating	7.00

Ability to Contribute (1.0)

-Funding	5
-Government Technology	8
-Industry Technology	5
-Technology Transfer	10
-Security	10
-Strength Rating	7.60

Degree of Convergence Weight: 1.00

U. S. Strength 17.75

Foreign Strength 18.35

Probability of Success: Medium

Payoff Potential: Medium

COMPOSITE STRENGTH 36.10

PROGRAM SHORT TITLE: TSS

UNITED STATES

Level of Commitment (0.75)

-Congress	1
-OSD	1
-Service	5
-Strength Rating	1.75

FOREIGN

Level of Commitment (0.75)

-Legislature	1
-MOD	1
-Service/Equiv.	5
-Strength Rating	1.75

Degree of Convergence Weight: 1.0

Programmatic Factors (1.5)

-Program Objective	1
-Military Req'm'ts	10
-Alliance Req'm'ts	NA
-MOU/Program Schedules	8
-Industrial Base Impact	5
-3rd Party Sales Objectives	NA
-Strength Rating	9.00

Programmatic Factors (1.5)

-Program Objective	1
-Military Req'm'ts	10
-Alliance Req'm'ts	NA
-MOU/Program Schedules	8
-Industrial Base Impact	5
-3rd Party Sales Objectives	NA
-Strength Rating	9.00

Degree of Convergence Weight: 1.00

Ability to Contribute (1.0)

-Funding	6
-Government Technology	10
-Industry Technology	5
-Technology Transfer	10
-Security	NA
-Strength Rating	7.75

Ability to Contribute (1.0)

-Funding	4
-Government Technology	10
-Industry Technology	5
-Technology Transfer	10
-Security	10
-Strength Rating	7.80

Degree of Convergence Weight: 0.75

U. S. Strength 18.50

Foreign Strength 18.55

Probability of Success: Medium

Payoff Potential: Medium-Low

COMPOSITE STRENGTH 33.16

PROGRAM SHORT TITLE: OC-J

UNITED STATES

Level of Commitment (0.75)

-Congress	1
-OSD	1
-Service	5
-Strength Rating	1.75

FOREIGN

Level of Commitment (0.75)

-Legislature	1
-MOD	1
-Service/Equiv.	1
-Strength Rating	0.75

Degree of Convergence Weight: 1.0

Programmatic Factors (1.5)

-Program Objective	2
-Military Req'm'ts	3
-Alliance Req'm'ts	NA
-MOU/Program Schedules	10
-Industrial Base Impact	5
-3rd Party Sales Objectives	NA
-Strength Rating	7.50

Programmatic Factors (1.5)

-Program Objective	2
-Military Req'm'ts	3
-Alliance Req'm'ts	NA
-MOU/Program Schedules	10
-Industrial Base Impact	5
-3rd Party Sales Objectives	NA
-Strength Rating	7.50

Degree of Convergence Weight: 1.00

Ability to Contribute (1.0)

-Funding	1
-Government Technology	10
-Industry Technology	NA
-Technology Transfer	10
-Security	NA
-Strength Rating	7.00

Ability to Contribute (1.0)

-Funding	1
-Government Technology	10
-Industry Technology	NA
-Technology Transfer	10
-Security	10
-Strength Rating	7.75

Degree of Convergence Weight: 1.00

U. S. Strength 16.25

Foreign Strength 16.00

Probability of Success: Medium

Payoff Potential: Medium

COMPOSITE STRENGTH 32.25

PROGRAM SHORT TITLE: OC-N

UNITED STATES

Level of Commitment (0.75)

-Congress	1
-OSD	1
-Service	5
-Strength Rating	1.75

FOREIGN

Level of Commitment (0.75)

-Legislature	1
-MOD	1
-Service/Equiv.	1
-Strength Rating	0.75

Degree of Convergence Weight: 1.0

Programmatic Factors (1.5)

-Program Objective	2
-Military Reqmts	3
-Alliance Reqmts	NA
-MOU/Program Schedules	10
-Industrial Base Impact	5
-3rd Party Sales Objectives	NA
-Strength Rating	7.50

Programmatic Factors (1.5)

-Program Objective	2
-Military Reqmts	3
-Alliance Reqmts	NA
-MOU/Program Schedules	10
-Industrial Base Impact	5
-3rd Party Sales Objectives	NA
-Strength Rating	7.50

Degree of Convergence Weight: 1.00

Ability to Contribute (1.0)

-Funding	1
-Government Technology	10
-Industry Technology	NA
-Technology Transfer	10
-Security	NA
-Strength Rating	7.00

Ability to Contribute (1.0)

-Funding	1
-Government Technology	10
-Industry Technology	NA
-Technology Transfer	10
-Security	10
-Strength Rating	7.75

Degree of Convergence Weight: 1.00

U. S. Strength 16.25

Foreign Strength 16.00

Probability of Success: Medium

Payoff Potential: Medium

COMPOSITE STRENGTH 32.25

PROGRAM SHORT TITLE: OCA-G

UNITED STATES

Level of Commitment (0.75)

-Congress	1
-OSD	1
-Service	4
-Strength Rating	1.50

FOREIGN

Level of Commitment (0.75)

-Legislature	1
-MOD	1
-Service/Equiv.	1
-Strength Rating	0.75

Degree of Convergence Weight: 1.0

Programmatic Factors (1.5)

-Program Objective	1
-Military Reqmts	2
-Alliance Reqmts	2
-MOU/Program Schedules	10
-Industrial Base Impact	5
-3rd Party Sales Objectives	NA
-Strength Rating	6.00

Programmatic Factors (1.5)

-Program Objective	1
-Military Reqmts	2
-Alliance Reqmts	2
-MOU/Program Schedules	10
-Industrial Base Impact	5
-3rd Party Sales Objectives	NA
-Strength Rating	6.00

Degree of Convergence Weight: 1.00

Ability to Contribute (1.0)

-Funding	6
-Government Technology	10
-Industry Technology	NA
-Technology Transfer	10
-Security	NA
-Strength Rating	8.67

Ability to Contribute (1.0)

-Funding	5
-Government Technology	10
-Industry Technology	NA
-Technology Transfer	10
-Security	10
-Strength Rating	8.75

Degree of Convergence Weight: 1.00

U. S. Strength 16.17

Foreign Strength 15.50

Probability of Success: Medium

Payoff Potential: Medium-Low

COMPOSITE STRENGTH 31.67

PROGRAM SHORT TITLE: OCA-M

UNITED STATES

Level of Commitment (0.75)

-Congress	1
-OSD	1
-Service	4
-Strength Rating	1.50

FOREIGN

Level of Commitment (0.75)

-Legislature	1
-MOD	1
-Service/Equiv.	1
-Strength Rating	0.75

Degree of Convergence Weight: 1.0

Programmatic Factors (1.5)

-Program Objective	1
-Military Req'm'ts	2
-Alliance Req'm'ts	2
-MOU/Program Schedules	10
-Industrial Base Impact	5
-3rd Party Sales Objectives	NA
-Strength Rating	6.00

Programmatic Factors (1.5)

-Program Objective	1
-Military Req'm'ts	2
-Alliance Req'm'ts	2
-MOU/Program Schedules	10
-Industrial Base Impact	5
-3rd Party Sales Objectives	NA
-Strength Rating	6.00

Degree of Convergence Weight: 1.00

Ability to Contribute (1.0)

-Funding	6
-Government Technology	10
-Industry Technology	NA
-Technology Transfer	10
-Security	NA
-Strength Rating	8.67

Ability to Contribute (1.0)

-Funding	5
-Government Technology	10
-Industry Technology	NA
-Technology Transfer	10
-Security	10
-Strength Rating	8.75

Degree of Convergence Weight: 1.00

U. S. Strength 16.17

Foreign Strength 15.50

Probability of Success: Medium

Payoff Potential: Medium-Low

COMPOSITE STRENGTH 31.67

PROGRAM SHORT TITLE: MWSS

UNITED STATES

Level of Commitment (0.75)

-Congress	1
-OSD	1
-Service	5
-Strength Rating	1.75

FOREIGN

Level of Commitment (0.75)

-Legislature	1
-MOD	1
-Service/Equiv.	5
-Strength Rating	1.75

Degree of Convergence Weight: 1.0

Programmatic Factors (1.5)

-Program Objective	1
-Military Reqmts	4
-Alliance Reqmts	NA
-MOU/Program Schedules	10
-Industrial Base Impact	8
-3rd Party Sales Objectives	NA
-Strength Rating	8.63

Programmatic Factors (1.5)

-Program Objective	1
-Military Reqmts	4
-Alliance Reqmts	NA
-MOU/Program Schedules	10
-Industrial Base Impact	5
-3rd Party Sales Objectives	NA
-Strength Rating	7.50

Degree of Convergence Weight: 1.00

Ability to Contribute (1.0)

-Funding	1
-Government Technology	10
-Industry Technology	8
-Technology Transfer	5
-Security	NA
-Strength Rating	6.00

Ability to Contribute (1.0)

-Funding	1
-Government Technology	10
-Industry Technology	8
-Technology Transfer	5
-Security	5
-Strength Rating	5.80

Degree of Convergence Weight: 1.00

U. S. Strength 16.38

Foreign Strength 15.05

Probability of Success: Medium

Payoff Potential: Medium-Low

COMPOSITE STRENGTH 31.43

PROGRAM SHORT TITLE: RSR

UNITED STATES

Level of Commitment (0.75)

-Congress	1
-OSD	1
-Service	5
-Strength Rating	1.75

FOREIGN

Level of Commitment (0.75)

-Legislature	1
-MOD	1
-Service/Equiv.	5
-Strength Rating	1.75

Degree of Convergence Weight: 1.0

Programmatic Factors (1.5)

-Program Objective	1
-Military Reqmts	1
-Alliance Reqmts	NA
-MOU/Program Schedules	10
-Industrial Base Impact	5
-3rd Party Sales Objectives	NA
-Strength Rating	6.38

Programmatic Factors (1.5)

-Program Objective	1
-Military Reqmts	1
-Alliance Reqmts	NA
-MOU/Program Schedules	10
-Industrial Base Impact	5
-3rd Party Sales Objectives	NA
-Strength Rating	6.38

Degree of Convergence Weight: 1.00

Ability to Contribute (1.0)

-Funding	1
-Government Technology	8
-Industry Technology	5
-Technology Transfer	5
-Security	NA
-Strength Rating	4.75

Ability to Contribute (1.0)

-Funding	2
-Government Technology	8
-Industry Technology	5
-Technology Transfer	5
-Security	10
-Strength Rating	6.00

Degree of Convergence Weight: 1.00

U. S. Strength 12.88

Foreign Strength 14.13

Probability of Success: Medium

Payoff Potential: Medium

COMPOSITE STRENGTH 27.00

c. Results of Second Application

This second set of program evaluations is summarized in the table below:

PROGRAM NAME	COMPOSITE STRENGTH RATING	U. S. STRENGTH RATING	FOREIGN STRENGTH RATING	PROBABILITY OF SUCCESS	PAYOFF POTENTIAL
RSU	51.25	21.10	20.90	MEDIUM-HIGH	MEDIUM-HIGH
AES	45.31	18.25	18.65	MEDIUM-HIGH	MEDIUM
TLSS	42.56	18.10	16.65	MEDIUM-HIGH	MEDIUM-HIGH
TTS	41.63	16.65	17.35	MEDIUM-HIGH	MEDIUM
DTS	36.10	17.75	18.35	MEDIUM	MEDIUM
TSS	33.16	18.50	18.55	MEDIUM	MEDIUM-LOW
OC-J	32.25	16.25	16.00	MEDIUM	MEDIUM
OC-N	32.25	16.25	16.00	MEDIUM	MEDIUM
OCA-G	31.67	16.17	15.50	MEDIUM	MEDIUM-LOW
OCA-M	31.67	16.17	15.50	MEDIUM	MEDIUM-LOW
MWSS	31.43	16.38	15.05	MEDIUM	MEDIUM-LOW
RSR	27.00	12.88	14.13	MEDIUM	MEDIUM-LOW

C. REVISED SUCCESS CRITERIA EVALUATION

1. Revised U. S./Foreign Evaluation Criteria

On July 30, 1991, the IP office revised the evaluation criteria. The revision separated two criteria ("Technology Transfer" and "Security") from the "Ability to Contribute" area and established them in a new area, "Technology/Security Factors." Under the "Programmatic Factors" area, the revision deleted one criterion ("Alliance Requirements"), replaced two criteria ("Industrial Base Impact" and "3rd Party Sales Objectives") with new ones ("Workshare" and "Payoff"), and added NATO operational requirements criteria to the "Military Requirements" section. The revised worksheet is provided below:

I. LEVEL OF COMMITMENT:	10	5	1
- CONGRESS/ EQUIVALENT	LEGISLATION	MEMBER/STAFF	NO INTEREST
- OSD/MOD	USD (A) UP	DUSD/ASD UP	WORKING LEVEL
- SERVICE/ EQUIVALENT	ASN (RDA) UP	SPONSOR SYSCOM/PEO	WORKING LEVEL

II. PROGRAMMATIC FACTORS	10	5	1
- PROGRAM OBJECTIVE	MAJOR SYSTEM FLEET DELIVERY	OTHER SYSTEM FLEET DELIVERY	TECHBASE/ STUDIES
- MILITARY REQUIREMENTS	APPROVED OR/NSR	APPROVED TOR/NST	INTENT/NO OR REQUIRED
- MOU/PROGRAM SCHEDULES	NO MOU/ PROGRAM SCHEDULE PROBLEMS	CONSTRAINED MOU/PROGRAM SCHEDULE	MAJOR SCHEDULE DISCONNECT
- WORKSHARE	WORKSHARE EQUALS COSTSHARE	WORKSHARE W/IN PLUS OR MINUS 10% OF COSTSHARE	WORKSHARE DOES NOT EQUAL COSTSHARE
- PAYOFF	GREATLY ENHANCES FLEET EFFECTIVE-NESS	ENHANCES FLEET EFFECTIVE-NESS	REDUNDANT SYSTEM

III. ABILITY TO CONTRIBUTE	10	5	1
- FUNDING	FULLY FUNDED IN POM	PARTIALLY FUNDED IN POM	INTENT TO POM
- GOVERNMENT TECHNOLOGY	FULL SYSCOM/ LAB SUPPORT	PARTIAL SYSCOM/LAB SUPPORT	SYSCOM/LAB RESOURCE PROBLEMS

IV. TECHNOLOGY/ SECURITY FACTORS	10	5	1
- TECHNOLOGY TRANSFER	NO TECH TRANSFER ISSUES	SELECTED TECH TRANSFER ISSUES	MAJOR TECH TRANSFER ISSUES
- SECURITY	LOW RISK	MEDIUM RISK	HIGH RISK

2. Revised Evaluation Method

The evaluation process associated with this new set of criteria differs from the initial process. The weights (0.75, 1.50, and 1.00) of the initial process are again assigned to the areas of "Level of Commitment," "Programmatic Factors," and "Ability to Contribute," and a weight of 1.00 is assigned to the new area "Technology/Security Factors." U. S. and foreign strength ratings are computed as before, but the composite strength rating computation differs. Under the initial process, each area's strength ratings (U. S. and foreign) were first summed and then multiplied by subjectively assigned weights; the resultant products were then summed to arrive at the composite strength rating. Under the revised procedure, all area strength ratings (both U. S. and foreign) are summed and multiplied by a single, subjectively assigned weight factor. Summary U. S. and foreign strength ratings are not computed under the revised process; neither are qualitative measures given to "Probability of Success" or "Payoff Potential."

3. Application of Revised Evaluation Criteria and Method

a. Programs Evaluated

Four programs were evaluated using the revised criteria and procedures. The following table identifies these programs:

PROGRAM TITLE	FOREIGN PARTICIPANTS
MARITIME UNMANNED AERIAL VEHICLE (MUAV)	CANADA, FRANCE, GERMANY, NETHERLANDS, NORWAY, UNITED KINGDOM
ADVANCED STEEL SYSTEMS (ADV ST)	JAPAN
ALUMINUM OXYGEN BATTERIES (AL BAT)	CANADA
REMOTE ATMOSPHERIC AND IONOSPHERIC DETECTION SYSTEM (RAIDS)	AUSTRALIA, BELGIUM, CANADA, GERMANY, SWEDEN

b. Evaluation Sheets

The evaluation sheets representing these four programs are reproduced on the following pages:

PROGRAM SHORT TITLE: MUAV

UNITED STATES

Level of Commitment (0.75)

-Congress	1
-OSD	1
-Service	6
-Strength Rating	2.00

Programmatic Factors (1.5)

-Program Objective	8
-Military Reqm'ts	8
-MOU/Program Schedules	10
-Workshare	5
-Payoff	8
-Strength Rating	11.70

Ability to Contribute (1.0)

-Funding	10
-Government Technology	0
-Strength Rating	10.00

Technology/Security (1.0)

-Technology Transfer	10
-Security	10
-Strength Rating	10.00

FOREIGN

Level of Commitment (0.75)

-Legislature	0
-MOD	1
-Service/Equiv.	6
-Strength Rating	2.63

Programmatic Factors (1.5)

-Program Objective	8
-Military Reqm'ts	7
-MOU/Program Schedules	10
-Workshare	5
-Payoff	8
-Strength Rating	11.40

Ability to Contribute (1.0)

-Funding	5
-Government Technology	0
-Strength Rating	5.00

Technology/Security (1.0)

-Technology Transfer	10
-Security	0
-Strength Rating	10.00

OVERALL STRENGTH MATCHING 1.00

COMPOSITE STRENGTH 62.73

PROGRAM SHORT TITLE: ADV ST

UNITED STATES

Level of Commitment (0.75)

-Congress	1
-OSD	1
-Service	3
-Strength Rating	1.75

Programmatic Factors (1.5)

-Program Objective	6
-Military Reqm'ts	3
-MOU/Program Schedules	2
-Workshare	0
-Payoff	8
-Strength Rating	7.13

Ability to Contribute (1.0)

-Funding	5
-Government Technology	10
-Strength Rating	7.50

Technology/Security (1.0)

-Technology Transfer	9
-Security	10
-Strength Rating	9.50

FOREIGN

Level of Commitment (0.75)

-Legislature	1
-MOD	5
-Service/Equiv.	0
-Strength Rating	2.25

Programmatic Factors (1.5)

-Program Objective	5
-Military Reqm'ts	0
-MOU/Program Schedules	0
-Workshare	0
-Payoff	7
-Strength Rating	9.00

Ability to Contribute (1.0)

-Funding	0
-Government Technology	8
-Strength Rating	8.00

Technology/Security (1.0)

-Technology Transfer	9
-Security	0
-Strength Rating	9.00

OVERALL STRENGTH MATCHING 1.25

COMPOSITE STRENGTH 58.00

PROGRAM SHORT TITLE: AL BAT

UNITED STATES

Level of Commitment (0.75)

-Congress	1
-OSD	3
-Service	5
-Strength Rating	2.25

Programmatic Factors (1.5)

-Program Objective	5
-Military Reqmts	10
-MOU/Program Schedules	5
-Workshare	0
-Payoff	9
-Strength Rating	10.88

Ability to Contribute (1.0)

-Funding	10
-Government Technology	10
-Strength Rating	10.00

Technology/Security (1.0)

-Technology Transfer	10
-Security	0
-Strength Rating	10.00

FOREIGN

Level of Commitment (0.75)

-Legislature	1
-MOD	1
-Service/Equiv.	1
-Strength Rating	0.75

Programmatic Factors (1.5)

-Program Objective	0
-Military Reqmts	0
-MOU/Program Schedules	5
-Workshare	2
-Payoff	2
-Strength Rating	4.50

Ability to Contribute (1.0)

-Funding	7
-Government Technology	0
-Strength Rating	7.00

Technology/Security (1.0)

-Technology Transfer	10
-Security	10
-Strength Rating	10.00

OVERALL STRENGTH MATCHING 1.00

COMPOSITE STRENGTH 55.38

PROGRAM SHORT TITLE: RAIDS

UNITED STATES

Level of Commitment (0.75)

-Congress	1
-OSD	1
-Service	2
-Strength Rating	1.00

Programmatic Factors (1.5)

-Program Objective	2
-Military Reqmts	8
-MOU/Program Schedules	8
-Workshare	0
-Payoff	4
-Strength Rating	8.25

Ability to Contribute (1.0)

-Funding	5
-Government Technology	10
-Strength Rating	7.50

Technology/Security (1.0)

-Technology Transfer	5
-Security	5
-Strength Rating	5.00

FOREIGN

Level of Commitment (0.75)

-Legislature	1
-MOD	1
-Service/Equiv.	1
-Strength Rating	0.75

Programmatic Factors (1.5)

-Program Objective	5
-Military Reqmts	0
-MOU/Program Schedules	0
-Workshare	0
-Payoff	2
-Strength Rating	5.25

Ability to Contribute (1.0)

-Funding	3
-Government Technology	10
-Strength Rating	6.50

Technology/Security (1.0)

-Technology Transfer	5
-Security	0
-Strength Rating	5.00

OVERALL STRENGTH MATCHING 1.00

COMPOSITE STRENGTH 39.25

c. Re-evaluation of Programs Using Revised Evaluation

Criteria and Method

Attempting to standardize the evaluation process, the IP office re-evaluated the six programs initially evaluated (NMMS, ASMCM, SPIN, CIP, CSNI, and C2P2) using the new criteria and procedures. These re-evaluations are reproduced on the following pages:

PROGRAM SHORT TITLE: NMMS

UNITED STATES

Level of Commitment (0.75)

-Congress	1
-OSD	3
-Service	8
-Strength Rating	3.00

Programmatic Factors (1.5)

-Program Objective	4
-Military Req'm'ts	10
-MOU/Program Schedules	5
-Workshare	5
-Payoff	8
-Strength Rating	9.60

Ability to Contribute (1.0)

-Funding	10
-Government Technology	10
-Strength Rating	10.00

Technology/Security (1.0)

-Technology Transfer	10
-Security	5
-Strength Rating	7.50

FOREIGN

Level of Commitment (0.75)

-Legislature	1
-MOD	6
-Service/Equiv.	9
-Strength Rating	4.00

Programmatic Factors (1.5)

-Program Objective	4
-Military Req'm'ts	10
-MOU/Program Schedules	10
-Workshare	5
-Payoff	8
-Strength Rating	11.10

Ability to Contribute (1.0)

-Funding	10
-Government Technology	10
-Strength Rating	10.00

Technology/Security (1.0)

-Technology Transfer	10
-Security	0
-Strength Rating	10.00

OVERALL STRENGTH MATCHING 1.50

COMPOSITE STRENGTH 75.20

PROGRAM SHORT TITLE: ASMCM

UNITED STATES

Level of Commitment (0.75)

-Congress	1
-OSD	1
-Service	6
-Strength Rating	2.00

Programmatic Factors (1.5)

-Program Objective	7
-Military Reqmts	10
-MOU/Program Schedules	10
-Workshare	5
-Payoff	10
-Strength Rating	12.60

Ability to Contribute (1.0)

-Funding	7
-Government Technology	10
-Strength Rating	8.50

Technology/Security (1.0)

-Technology Transfer	5
-Security	10
-Strength Rating	5.00

FOREIGN

Level of Commitment (0.75)

-Legislature	1
-MOD	3
-Service/Equiv.	5
-Strength Rating	2.25

Programmatic Factors (1.5)

-Program Objective	7
-Military Reqmts	5
-MOU/Program Schedules	10
-Workshare	5
-Payoff	10
-Strength Rating	11.10

Ability to Contribute (1.0)

-Funding	7
-Government Technology	10
-Strength Rating	8.50

Technology/Security (1.0)

-Technology Transfer	5
-Security	0
-Strength Rating	5.00

OVERALL STRENGTH MATCHING 1.50

COMPOSITE STRENGTH 65.95

PROGRAM SHORT TITLE: SPIN

UNITED STATES

Level of Commitment (0.75)

-Congress	1
-OSD	3
-Service	8
-Strength Rating	3.00

Programmatic Factors (1.5)

-Program Objective	6
-Military Req'm'ts	10
-MOU/Program Schedules	9
-Workshare	5
-Payoff	10
-Strength Rating	12.00

Ability to Contribute (1.0)

-Funding	10
-Government Technology	8
-Strength Rating	9.00

Technology/Security (1.0)

-Technology Transfer	7
-Security	10
-Strength Rating	8.50

FOREIGN

Level of Commitment (0.75)

-Legislature	1
-MOD	5
-Service/Equiv.	8
-Strength Rating	3.50

Programmatic Factors (1.5)

-Program Objective	6
-Military Req'm'ts	10
-MOU/Program Schedules	9
-Workshare	5
-Payoff	10
-Strength Rating	12.00

Ability to Contribute (1.0)

-Funding	10
-Government Technology	8
-Strength Rating	9.00

Technology/Security (1.0)

-Technology Transfer	7
-Security	0
-Strength Rating	7.00

OVERALL STRENGTH MATCHING 1.25

COMPOSITE STRENGTH 68.50

PROGRAM SHORT TITLE: CIP

UNITED STATES

Level of Commitment (0.75)

-Congress	1
-OSD	8
-Service	7
-Strength Rating	4.00

Programmatic Factors (1.5)

-Program Objective	5
-Military Req'm'ts	8
-MOU/Program Schedules	10
-Workshare	5
-Payoff	8
-Strength Rating	10.80

Ability to Contribute (1.0)

-Funding	5
-Government Technology	8
-Strength Rating	6.50

Technology/Security (1.0)

-Technology Transfer	8
-Security	10
-Strength Rating	9.00

FOREIGN

Level of Commitment (0.75)

-Legislature	1
-MOD	8
-Service/Equiv.	9
-Strength Rating	4.50

Programmatic Factors (1.5)

-Program Objective	5
-Military Req'm'ts	8
-MOU/Program Schedules	10
-Workshare	5
-Payoff	8
-Strength Rating	10.80

Ability to Contribute (1.0)

-Funding	9
-Government Technology	8
-Strength Rating	8.50

Technology/Security (1.0)

-Technology Transfer	8
-Security	0
-Strength Rating	8.00

OVERALL STRENGTH MATCHING 1.00

COMPOSITE STRENGTH 62.10

PROGRAM SHORT TITLE: CSNI

UNITED STATES

Level of Commitment (0.75)

-Congress	3
-OSD	4
-Service	6
-Strength Rating	3.25

Programmatic Factors (1.5)

-Program Objective	1
-Military Req'm'ts	7
-MOU/Program Schedules	8
-Workshare	5
-Payoff	5
-Strength Rating	7.80

Ability to Contribute (1.0)

-Funding	5
-Government Technology	10
-Strength Rating	7.50

Technology/Security (1.0)

-Technology Transfer	10
-Security	5
-Strength Rating	7.50

FOREIGN

Level of Commitment (0.75)

-Legislature	2
-MOD	5
-Service/Equiv.	6
-Strength Rating	3.25

Programmatic Factors (1.5)

-Program Objective	3
-Military Req'm'ts	8
-MOU/Program Schedules	8
-Workshare	5
-Payoff	5
-Strength Rating	8.70

Ability to Contribute (1.0)

-Funding	10
-Government Technology	10
-Strength Rating	10.00

Technology/Security (1.0)

-Technology Transfer	10
-Security	0
-Strength Rating	10.00

OVERALL STRENGTH MATCHING 1.25

COMPOSITE STRENGTH 62.38

PROGRAM SHORT TITLE: C2P2

UNITED STATES

Level of Commitment (0.75)

-Congress	1
-OSD	2
-Service	4
-Strength Rating	1.75

Programmatic Factors (1.5)

-Program Objective	1
-Military Req'm'ts	1
-MOU/Program Schedules	6
-Workshare	10
-Payoff	6
-Strength Rating	7.20

Ability to Contribute (1.0)

-Funding	2
-Government Technology	10
-Strength Rating	6.00

Technology/Security (1.0)

-Technology Transfer	8
-Security	5
-Strength Rating	6.50

FOREIGN

Level of Commitment (0.75)

-Legislature	1
-MOD	4
-Service/Equiv.	6
-Strength Rating	2.75

Programmatic Factors (1.5)

-Program Objective	1
-Military Req'm'ts	1
-MOU/Program Schedules	6
-Workshare	10
-Payoff	6
-Strength Rating	7.20

Ability to Contribute (1.0)

-Funding	8
-Government Technology	10
-Strength Rating	9.00

Technology/Security (1.0)

-Technology Transfer	8
-Security	0
-Strength Rating	8.00

OVERALL STRENGTH MATCHING 1.25

COMPOSITE STRENGTH 52.15

d. Results of Application of Revised Criteria and Method

The results of the evaluation conducted using the revised criteria and method are summarized in the table below, compared, when applicable, to the results of the initial evaluation:

PROGRAM	INITIAL EVALUATION	INITIAL RANK	REVISED EVALUATION	REVISED RANK
NMMS	58.53	1	75.20	1
SPIN	54.00	3	68.50	2
ASMCM	54.91	2	65.95	3
MUAV	NA	NA	62.73	4
CSNI	48.48	5	62.38	5
CIP	50.50	4	62.10	6
ADV ST	NA	NA	58.00	7
AL BAT	NA	NA	55.38	8
C2P2	35.94	6	52.15	9
RAIDS	NA	NA	39.25	10

D. ANOMALIES RESULTING FROM APPLICATION OF REVISED CRITERIA AND METHOD

Several anomalies are readily apparent regarding the two evaluation procedures. Of primary significance is the fact that the four programs being evaluated for the first time generally scored lower than those programs being re-evaluated using the revised procedures. Additionally, for two pairs

(ASMCM/SPIN and CIP/CSNI), the revised rankings are the reverse of the initial rankings. These anomalies caused the IP office to question whether there might be problems with the revised procedure; evaluations using the revised procedure were halted until a review could be conducted.

IV: ANALYSIS OF DATA

A. SPREADSHEET ANALYSIS OF INITIAL EVALUATION CRITERIA AND METHOD

1. Construction of Spreadsheet

To analyze the IPO evaluation process required translating the data from the various sets of evaluation sheets into a spreadsheet program that replicated both the appearance and the functions of the evaluation sheet. The cell contents of an example of this spreadsheet program are given below:

A1: NATO MECHANICAL MINESWEEPING SYSTEM
E3: FOREIGN: FRANCE, SPAIN,
A4: UNITED STATES
E4: THE NETHERLANDS, ITALY
A6: LEVEL OF COMMITMENT
E6: LEVEL OF COMMITMENT
A8: CONGRESS
C8: 1
E8: LEGISLATURE
G8: 1
A9: OSD
C9: 3
E9: MOD
G9: 6
A10: SERVICE
C10: 8
E10: SERVICE/EQUIV.
G10: 9
A11: WEIGHT
B11: 0.75
E11: WEIGHT
F11: 0.75
A12: STRENGTH RATING
C12: @SUM(C8..C10)/@COUNT(C8..C10)*B11
E12: STRENGTH RATING
G12: @SUM(G8..G10)/@COUNT(G8..G10)*F11
A14: PROGRAMMATIC FACTORS

E14: PROGRAMMATIC FACTORS
 A16: PROGRAM OBJECTIVES
 C16: 4
 E16: PROGRAM OBJECTIVES
 G16: 4
 A17: MILITARY RQMTS
 C17: 10
 E17: MILITARY RQMTS
 G17: 10
 A18: ALLIANCE RQMTS
 C18: 10
 E18: ALLIANCE RQMTS
 G18: 10
 A19: MOU/PROGRAM SKED
 C19: 5
 E19: MOU/PROGRAM SKED
 G19: 5
 A20: INDUST BASE IMPACT
 C20: 5
 E20: INDUST BASE IMPACT
 G20: 5
 A21: THIRD PARTY SALES
 C21: 5
 E21: THIRD PARTY SALES
 G21: 5
 A22: WEIGHT
 B22: 1.5
 E22: WEIGHT
 F22: 1.5
 A23: STRENGTH RATING
 C23: @SUM(C16..C21)/@COUNT(C16..C21)*B22
 E23: STRENGTH RATING
 G23: @SUM(G16..G21)/@COUNT(G16..G21)*F22
 A25: ABILITY TO CONTRIBUTE
 E25: ABILITY TO CONTRIBUTE
 A27: FUNDING
 C27: 10
 E27: FUNDING
 G27: 10
 A28: GOVT TECHNOLOGY
 C28: 10
 E28: GOVT TECHNOLOGY
 G28: 10
 A29: INDUST TECHNOLOGY
 C29: 8
 E29: INDUST TECHNOLOGY
 G29: 8
 A30: TECH TRANSFER
 C30: 10
 E30: TECH TRANSFER
 G30: 10

A31: SECURITY
 C31:
 E31: SECURITY
 G31: 5
 A32: WEIGHT
 B32: 1
 E32: WEIGHT
 F32: 1
 A33: STRENGTH RATING
 C33: @SUM(C27..C31)/@COUNT(C27..C31)*B32
 E33: STRENGTH RATING
 G33: @SUM(G27..G31)/@COUNT(G27..G31)*F32
 A35: TOTAL STRENGTH
 C35: +C12+C23+C33
 E35: TOTAL STRENGTH
 G35: +G12+G23+G33
 D38: DEGREE OF CONVERGENCE
 D40: COMBINED
 H40: COMPOSITE
 D41: STRENGTH
 F41: WEIGHT
 H41: WEIGHT
 A43: LEVEL OF COMMITMENT
 D43: @VALUE(C12)+@VALUE(G12)
 F43: 1
 H43: +D43*F43
 A44: PROGRAMMATIC FACTORS
 D44: @VALUE(C23)+@VALUE(G23)
 F44: 1.25
 H44: +D44*F44
 A45: ABILITY TO CONTRIBUTE
 D45: @VALUE(C33)+@VALUE(G33)
 F45: 1.5
 H45: +D45*F45
 E47: TOTAL COMPOSITE STRENGTH
 H47: +H43+H44+H45

While creating the spreadsheet, it was discovered that, for any line item on the evaluation sheet not given a numerical score (i.e. "Security" under the United States' "Ability to Contribute"), the corresponding cell on the spreadsheet (C31) had to be completely blank. Any entry (i.e. NA, 0, or even a global justification command) in such a cell would be counted as an entry in the subsequent "@COUNT"

formula used to compute the area strength rating (in this instance cell C33) and would result in an incorrect calculation.

2. Results of Spreadsheet Analysis

The key formula cells of this spreadsheet (C12, G12, C23, G23, C33, G33, C35, G35, and H47) duplicated the values of the area strength ratings, the total strength ratings, and the composite strength rating of the evaluation sheet. The values represented by the other formula cells (D43, H43, D44, H44, D45, H45) do not appear on the evaluation sheet but were included in the spreadsheet for ease of computation.

This spreadsheet analysis was applied to the evaluation sheets representing the initial evaluation performed on the following candidate programs:

- NATO Mechanical Minesweeping System
- Anti-Ship Missile Countermeasure
- "Spinnaker"
- U. S. PACOM Combined Interoperability Program
- NATO CSNI
- Continuous Processing of Solid Propellants
- Remote Sensing Unit with Synthetic Aperture Radar
- Airborne Electromagnetic Sensor
- Tactical Lightweight Surveillance Satellite
- Tactical Target Support
- Distributed Tactical Surveillance

- Tactical Ship Surveillance
- Oceanography Cooperation--Japan
- Oceanography Cooperation--Norway
- Ocean Color Assessment (G-I-N Sea)
- Ocean Color Assessment (Mediterranean Sea)
- Millimeter Wave Sea Surveillance
- Remote Spectrometry Research.

In every instance, the spreadsheet analysis of these programs directly correlated to all values on the evaluation sheets.

B. SPREADSHEET ANALYSIS OF REVISED EVALUATION CRITERIA AND METHOD

1. Construction of Spreadsheet

A second, similar spreadsheet based on the evaluation sheets of the revised evaluation criteria and procedures was then created; the criteria scores and weights of the Maritime Unmanned Aerial Vehicle (MUAV) evaluation sheet were used in creating the spreadsheet. The following represents the cell contents of this second spreadsheet:

A1: MUAV
 E2: FOREIGN: CANADA, FRANCE
 E3: GERMANY, NETHERLANDS
 A4: UNITED STATES
 E4: NORWAY, UNITED KINGDOM
 A6: LEVEL OF COMMITMENT
 E6: LEVEL OF COMMITMENT
 A8: CONGRESS
 C8: 1
 E8: LEGISLATURE

G8:
 A9: OSD
 C9: 1
 E9: MOD
 G9: 1
 A10: SERVICE
 C10: 6
 E10: SERVICE/EQUIV.
 G10: 6
 A11: WEIGHT
 B11: 0.75
 E11: WEIGHT
 F11: 0.75
 A12: STRENGTH RATING
 C12: @SUM(C8..C10)/@COUNT(C8..C10)*B11
 E12: STRENGTH RATING
 G12: @SUM(G8..G10)/@COUNT(G8..G10)*F11
 A14: PROGRAMMATIC FACTORS
 E14: PROGRAMMATIC FACTORS
 A16: PROGRAM OBJECTIVES
 C16: 8
 E16: PROGRAM OBJECTIVES
 G16: 8
 A17: MILITARY RQMTS
 C17: 8
 E17: MILITARY RQMTS
 G17: 7
 A18: MOU/PROGRAM SKED
 C18: 10
 E18: MOU/PROGRAM SKED
 G18: 10
 A19: WORKSHARE
 C19: 5
 E19: WORKSHARE
 G19: 5
 A20: PAYOFF
 C20: 8
 E20: PAYOFF
 G20: 8
 A21: WEIGHT
 B21: 1.5
 E21: WEIGHT
 F21: 1.5
 A22: STRENGTH RATING
 C22: @SUM(C16..C20)/@COUNT(C16..C20)*B21
 E22: STRENGTH RATING
 G22: @SUM(G16..G20)/@COUNT(G16..G20)*F21
 A24: ABILITY TO CONTRIBUTE
 E24: ABILITY TO CONTRIBUTE
 A26: FUNDING
 C26: 10

E26: FUNDING
 G26: 5
 A27: GOVT TECHNOLOGY
 C27:
 E27: GOVT TECHNOLOGY
 G27:
 A28: WEIGHT
 B28: 1
 E28: WEIGHT
 F28: 1
 A29: STRENGTH RATING
 C29: @SUM(C26..C27)/@COUNT(C26..C27)*B28
 E29: STRENGTH RATING
 G29: @SUM(G26..G27)/@COUNT(G26..G27)*F28
 A31: TECHNOLOGY/SECURITY
 E31: TECHNOLOGY/SECURITY
 A33: TECH TRANSFER
 C33: 10
 E33: TECH TRANSFER
 G33: 10
 A34: SECURITY
 C34: 10
 E34: SECURITY
 G34:
 A35: WEIGHT
 B35: 1
 E35: WEIGHT
 F35: 1
 A36: STRENGTH RATING
 C36: @SUM(C33..C34)/@COUNT(C33..C34)*B35
 E36: STRENGTH RATING
 G36: @SUM(G33..G34)/@COUNT(G33..G34)*F35
 A40: TOTAL COMBINED STRENGTH
 D40: +C12+G12+C22+G22+C29+G29+C36+G36
 A41: STRENGTH MATCHING
 D41: 1
 A43: TOTAL COMPOSITE STRENGTH
 D43: +D40*D41

2. Results of Spreadsheet Analysis

With this spreadsheet, the formula cells corresponding to the area strength ratings (C12, G12, C22, G22, C29, G29, C36 and G36) produced values identical with the values on the evaluation sheet. The composite strength formula cell (D43),

however, produced a value different from the evaluation sheet (97.80 vice 75.20). This second spreadsheet was applied to all the programs that had undergone the revised evaluation procedure, using the criteria scores and weights from the evaluation sheets. Always, the results were the same: area strength ratings corresponded to the evaluation sheets but composite strength ratings differed. The following table summarizes the results of this step in the analysis:

PROGRAM SHORT TITLE	SPREAD- SHEET COMPOSITE STRENGTH RATING	SPREAD- SHEET RANKING	EVALUA- TION SHEET COMPOSITE STRENGTH RATING	EVALUA- TION SHEET RANKING
NMMS	97.80	1	75.20	1
ASMCM	86.18	2	65.95	3
SPIN	80.00	3	68.50	2
CSNI	72.50	4	62.38	5
ADV ST	67.66	5	58.00	7
MUAV	62.73	6	62.73	4
CIF	62.10	7	62.10	6
C2P2	60.50	8	52.15	9
AL BAT	55.38	9	55.38	8
RAIDS	39.25	10	39.25	10

Since the spreadsheet calculations corresponded to the evaluation sheets in all area strength ratings, and differed in all composite strength ratings, the cell governing the computation of "Composite Strength" was examined further.

C. REASON FOR DISCREPANCY BETWEEN EVALUATION SHEETS AND SPREADSHEET ANALYSIS

The "Composite Strength" value on the evaluation sheet was being calculated in a manner different from the intent of the evaluation sheet. Referring back to the MUAV spreadsheet analysis, "Composite Strength" is calculated by the formula "+D40*D41" or, substituting in for cell D40, by the formula

"+(C12+G12+C22+G22+C29+G29+C36+G36)*D41."

This formula captures the intent of the revised procedure: to apply a single "Strength Matching" weight (D41) to the sum of all the area strength ratings.

The IPO evaluation sheets, however, calculate "Composite Strength" using the formula

"+C12+G12+C22+G22+C36+G36+((C29+G29)*D41)."

This formula isolates and sums the "Ability to Contribute" area strength ratings, applies the "Strength Matching" weight to that sum, and then adds in the remaining area strength ratings. By doing so, the formula is responsible for the

downward skewing noticed by the IP Office when they first applied the revised evaluation criteria.

D. APPLYING THE SPREADSHEET CALCULATIONS TO THOSE CANDIDATE PROGRAMS NEVER EVALUATED WITH REVISED CRITERIA AND METHOD

The spreadsheet program representing the intent of the revised criteria and procedure was then applied to the twelve programs never re-evaluated with the revised criteria. Criteria scores for the two line items ("Workshare" and "Payoff") not on the initial evaluation sheet had to be developed. For "Workshare," a value equivalent to the score given to "Industrial Base Impact" on the initial evaluation was used. For "Payoff," the subjectively determined "Payoff Potential" from the initial evaluation was translated into a numerical score between one and ten and used in the spreadsheet. The "Degree of Convergence" weight assigned to the "Ability to Contribute" area on the initial evaluation was used as the "Strength Matching" weight of the spreadsheet. The "Workshare" and "Strength Matching" assignments were done after consulting with Mr. Frank Kenlon of the IP Office; the "Payoff" assignment represents a natural progression from one format to another. The results of this analysis are shown in the table below:

PROGRAM SHORT TITLE	STRENGTH WEIGHTING	COMPOSITE STRENGTH RATING
RSU	1.25	76.25
AES	1.25	69.06
TLSS	1.25	58.63
DTS	1.00	53.90
TTS	1.25	53.25
OCA-G	1.00	50.35
OCA-M	1.00	50.35
OC-J	1.00	48.50
OC-N	1.00	48.50
TSS	0.75	41.03
MWSS	1.00	39.20
RSR	1.00	38.70

E. FINAL PRIORITY RANKING OF ALL 22 CANDIDATE PROGRAMS

The following table represents the final ranking of the 22 programs based on the composite strength ratings calculated by the spreadsheet; included is a column with the current status of each candidate program:

PROGRAM SHORT TITLE	COMPOSITE STRENGTH RATING	CURRENT STATUS
NMMS	97.80	SIGNED MOU
ASMCM	86.18	AWAITING START OF NEGOTIATIONS
SPIN	80.00	IN NEGOTIATION
RSU	76.25	PROPOSAL WITHDRAWN

PROGRAM SHORT TITLE	COMPOSITE STRENGTH RATING	CURRENT STATUS
CSNI	72.50	SIGNED MOU
AES	69.06	PROPOSAL WITHDRAWN
ADV ST	67.66	DEVELOPING RAN
MUAV	62.73	DEVELOPING RAN
CIP	62.10	AWAITING START OF NEGOTIATIONS
C2P2	60.50	DEVELOPING RAN
TLSS	58.63	PROPOSAL WITHDRAWN
AL BAT	55.38	DEVELOPING RAN
DTS	53.90	PROPOSAL WITHDRAWN
TTS	53.25	PROPOSAL WITHDRAWN
OCA-G	50.35	PROPOSAL WITHDRAWN
OCA-M	50.35	PROPOSAL WITHDRAWN
OC-J	48.50	PROPOSAL WITHDRAWN
OC-N	48.50	PROPOSAL WITHDRAWN
TSS	41.03	PROPOSAL WITHDRAWN
RAIDS	39.25	PROPOSAL WITHDRAWN
MWSS	39.20	PROPOSAL WITHDRAWN
RSR	38.70	PROPOSAL WITHDRAWN

With the spreadsheet evaluation, it appears that a composite strength score of 55 or above represents a threshold; all programs that did not reach that threshold resulted in the candidate program being withdrawn from consideration. Two programs (RSU and AES) that exceeded the threshold also had their proposals withdrawn; to correlate their withdrawal to their evaluation scores, statistical analysis techniques were applied to the spreadsheet evaluation scores.

F. STATISTICAL ANALYSIS OF SPREADSHEET EVALUATION SCORES

Based on the status of each of the 22 programs, the programs were assigned to one of two groups, Unsuccessful or Successful, to perform a statistical analysis of the spreadsheet evaluation scores. The Unsuccessful group consisted of those programs with a status indicating that the proposal had been withdrawn; the Successful group consisted of all others.

Combined (U. S. and Foreign) median and sample mean scores for each of the four evaluation areas of the spreadsheet (Level of Commitment, Programmatic Factors, Ability to Contribute, and Technology/Security) were calculated for each group; the standard distribution of the mean was also calculated. The following four tables record the results of those calculations:

COMBINED LEVEL OF COMMITMENT	UNSUCCESSFUL PROPOSALS	SUCCESSFUL PROPOSALS
MEDIAN	3.50	4.63
SAMPLE MEAN	3.08	5.54
STANDARD DEVIATION	0.88	2 00

COMBINED PROGRAMMATIC FACTORS	UNSUCCESSFUL PROPOSALS	SUCCESSFUL PROPOSALS
MEDIAN	15.00	20.70
SAMPLE MEAN	15.44	19.50
STANDARD DEVIATION	2.47	3.87

COMBINED ABILITY TO CONTRIBUTE	UNSUCCESSFUL PROPOSALS	SUCCESSFUL PROPOSALS
MEDIAN	13.00	17.00
SAMPLE MEAN	13.12	16.67
STANDARD DEVIATION	2.36	1.71

COMBINED TECHNOLOGY/ SECURITY	UNSUCCESSFUL PROPOSALS	SUCCESSFUL PROPOSALS
MEDIAN	20.00	17.50
SAMPLE MEAN	16.73	17.00
STANDARD DEVIATION	4.38	2.49

Of all the median and sample means calculated, the most statistically significant, in terms of the range of score disparity between the Unsuccessful and Successful groups, are

the sample mean scores of the Level of Commitment area. Combined median, sample means, and standard distributions were calculated for each line item in the Level of Commitment area; the results are shown in the three tables below:

COMBINED CONGRESS/ LEGISLATURE	UNSUCCESSFUL PROPOSALS	SUCCESSFUL PROPOSALS
MEDIAN	2.00	2.00
SAMPLE MEAN	2.00	2.22
STANDARD DEVIATION	0.00	1.09

COMBINED OSD/MOD	UNSUCCESSFUL PROPOSALS	SUCCESSFUL PROPOSALS
MEDIAN	2.00	8.00
SAMPLE MEAN	2.00	7.33
STANDARD DEVIATION	0.00	4.09

COMBINED SERVICE/ EQUIVALENT	UNSUCCESSFUL PROPOSALS	SUCCESSFUL PROPOSALS
MEDIAN	10.00	12.00
SAMPLE MEAN	8.46	11.44
STANDARD DEVIATION	3.38	4.69

Statistically, the most significant of these line item scores are the median and sample mean values of the combined OSD/MOD line item scores. Without OSD/MOD support, a proposal

appears doomed; with OSD/MOD support, a proposal's weaknesses in other areas may be surmounted.

G. CORRELATION OF IPO'S EVALUATION CRITERIA WITH OSD SUCCESS INDICATORS

At a Four Powers (United States, United Kingdom, France, Germany) Conference held in Monterey, California on October 5, 1991, the Deputy Under Secretary of Defense for International Programs (DUSD(IP)) briefed the participants on OSD's viewpoint regarding the criteria of success for cooperative programs; the OSD criteria are presented below:

- A common, well defined requirement;
- An early start supported by technology cooperation and venture capital from Nunn amendment funding;
- A clear view ahead on life-cycle funding;
- A clear view of competitive programs;
- Equal priority for each player;
- Two or three partners maximum;
- Each partner bringing something to the program besides money;
- The will to see it through, including a mutual understanding of cultures, concurrence on acquisition strategy, strong program managers, and support at the highest level.

The policy, procedures and criteria implemented by IPO through the evaluation of candidate programs generally supports the OSD success criteria. One instance of divergence

pertains to the number of partners being considered for a program; IPO does not take into account a candidate program having more than three partners while conducting its evaluation. Unless it has significant OSD/MOD support, a program with an excessive number of partners may experience difficulties obtaining the authority to negotiate an international agreement.

V. CONCLUSIONS AND RECOMMENDATIONS

A. CONCLUSIONS

The examination of the evaluation performed by the Navy International Programs Office on 22 candidate program proposals led to the following conclusions:

- Upon revising the success criteria, a miscommunication resulted in evaluations being conducted in such a manner that overemphasized the "Ability to Contribute" area of the criteria and that produced inaccurate "Composite Strength" scores and ranking.
- The single, evaluation criteria line item that principally determines whether a candidate program gains approval to develop the Request Authority to Negotiate document is the level of OSD/MOD support of the program; by extension, the single principal evaluation area is the "Level of Commitment" area.
- The International Programs Office's policy, procedures, and evaluation criteria are in general agreement with their OSD counterparts; however, the International Programs Office does not penalize a candidate program for having an excessive number of partners.

B. RECOMMENDATIONS

The recommendations derived from the above conclusions are as follows:

- The International Programs Office should correct the software programming error that produces the evaluation anomalies; this should be accomplished by implementing the spreadsheet "Composite Strength" formula in Section IV-C of this thesis.
- The International Programs Office should direct its resources at those candidate programs with a composite

strength score of 55 or above, and at all candidate programs with a combined OSD/MOD line item score of three or above.

- The International Programs Office should subtract points from the composite strength scores of those candidate programs with an excessive number of partners before ranking to reflect the greater risk of the program.
- The International Programs Office should continue to critique the criteria and procedures used to evaluate candidate programs to stay current with the rapidly changing environment of the international arena.

LIST OF REFERENCES

1. Callaghan, Thomas A. "NATO Still in the Throes of Structural Disarmament," Armed Forces Journal International, 126: 61, 64 (December, 1988).
2. Cannizzo, Cindy. "Procurement Via the Two-Way Street: Can It Achieve Its Objectives." International Arms Procurement: New Directions. Volume edited by Martin Edmonds. New York: Pergammon Press Inc., 1981.
3. Cole, Lt. Col. Willie E., Lt. Col. Richard C. Hochberg, and Cmdr. Alfred E. Therrien. Europe 1992: Catalyst for Change in Defense Acquisition: Report of the DSMC 1989-90 Military Research Fellows. Washington, DC: Defense Systems Management College, 1990.
4. Costello, Dr. Robert B. "Acquisition Office Shuffle Will Increase NATO Cooperation," Armed Forces Journal International, 126: 70-72 (December, 1988).
5. Department of Defense Instruction 5000.2. "Defense Acquisition Management Policies and Procedures." February 23, 1991.
6. Department of Defense Manual 5000.2-M. "Defense Acquisition Management Documentation and Reports." February, 1991.
7. Department of Defense Directive 5530.3. "International Agreements." June 11, 1987.
8. Draft Revision to DoD Directive 2000.9. "DoD Participation in Technical Exchange, Cooperative, and Coproduction Programs." Draft dated August 12, 1991.
9. Edmonds, Martin. "International Military Equipment Procurement Partnerships: The Basic Issues," International Arms Procurement: New Directions. Volume edited by Martin Edmonds. New York: Pergammon Press Inc., 1981.
10. Feldman, Dr. Jan. "Collaborative Production of Defense Equipment Within NATO," The DISAM Journal of International Security Assistance Management, 17: 48-66 (Summer, 1985).

11. Kenlon, Frank D., Director for International Agreements, Navy International Programs Office. Personal Interview conducted on September 25, 1991.
12. Kennedy, Paul. The Rise and Fall of the Great Powers. New York: Random House, 1987.
13. Kitfield, James. "Finally, Some Opportunities," Military Logistics Forum, 3: 74-80 (July/August, 1986).
14. Kitfield, James. "Obstacles Clog the Two-Way Street," Military Logistics Forum, 4: 77-89 (July/August, 1987).
15. Lightburn, David. "The Burdensharing Debate: Two Reports Lead the Way to Progress," NATO Review, 38: 26-30 (February, 1990).
16. McCarroll, Maj. William G. "The Future of Cooperative Programs." Student Report for Class 90-D, LD# 82540A. Air University, Maxwell AFB, Alabama.
17. Naval Research Advisory Committee Report on International Research and Development, NRAC Report No. 89-7. December, 1989.
18. Roos, John G. "US Revising Defense Trade Ratio Stats," Armed Forces Journal International, 126: 23 (July, 1988).
19. Shaffer, Stephen. "Linking Arms: Weapons Cooperation in NATO." International Arms Procurement: New Directions. Volume edited by Martin Edmonds. New York: Pergammon Press Inc., 1981.
20. Taft, William. "Armaments Cooperation Today and Tomorrow." NATO's Sixteen Nations, 34: 15-17 (December 1989/January 1990).
21. U. S. Congress, Office of Technology Assessment. Global Arms Trade. OTA-ISC-460. Washington, DC: U. S. Government Printing Office, June, 1991.

INITIAL DISTRIBUTION LIST

- | | | |
|----|--|---|
| 1. | Defense Technical Information Center
Cameron Station
Alexandria, Virginia 22304-6145 | 2 |
| 2. | Library, Code 0142
Naval Postgraduate School
Monterey, California 93943-5002 | 2 |
| 3. | Defense Logistics Studies Information Exchange
U. S. Army Logistics Management Center
Fort Lee, Virginia 23801-6043 | 2 |
| 4. | Dr. D. Lamm
Code AS/LT
Naval Postgraduate School
Monterey, California 93943-5000 | 3 |
| 5. | Mr. Frank D. Kenlon,
Director for International Agreements
Navy International Programs Office,
Washington, D. C. 20350-5000 | 1 |